THE IRON TRADE REVIEW

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THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

A week in the new year has only emphasized the tendencies so strongly defined at the close of 1901. Buying has gone on at a rate indicating the full confidence of consumers that 1902 will be one of the great years, if not the greatest, in the history of the trade. Such a tide of mid-winter activity is best compared with that of the closing weeks of 1898 and the opening of 1899. Prices then were considerably below today's level, and buyers then might naturally feel saf in making commitments covering the greater part of the year. Profitable as today's prices are to producers, and high as they seem in comparison with the few years preceding 1899, there is no indication that a receding movement is at all near. For the near future there are signs pointing in the other direction, in pig iron, at least, in spite of the stout opposition of good opinion. In the past week the advance in Southern iron from $11.50 to $12 Birmingham for No. 2 foundry has become unanimous; it was not so one week ago. In Central Western markets foundry, gray forge and basic irons have advanced. At Pittsburg gray forge has sold as high as $16.50 for prompt delivery, and at $16 to $16.75 on extended delivery. The strain upon steel works has resulted in increased pressure upon puddling furnaces, and the current output of gray forge is not equal to the demand. Basic iron has sold at $15.75 at furnace, or $16.50 at Pittsburg. The United States Steel Corporation has been a buyer to the extent of 10,000 tons. Increased cost to the blast furnaces in 1902 is a certainty, so far as coke is concerned, the price for Connellsville coke being fixed at $2.25 for the year, and there is a prospect that Lake Superior non-Bessemer ores will cost more than in 1901. The ore meeting has not been held as yet, but it is expected that definite announcement of prices on old-range Bessemer and non-Bessemer ores will be made within the next 10 days. The embarrassments due to the failure of furnaces to receive coke have been lessened in a few cases; two furnaces in the Chicago district have started up. In the Mahoning and Shenango Valleys, while some furnaces are better off, others are banking, and it is likely that the second quarter of the year will be well along before the pig iron sold to steel works for the first quarter will be fully delivered. In the South production has fallen off greatly because of holiday absences of labor. Everywhere furnaces are being crowded for deliveries, and all are delinquent, many being weeks behind. The pig iron buying of the past week has been good, and has included several round lots, Cincinnati leading in foundry grades. Buyers are now making liberal contracts for the second half of the year, this movement being more general today, though it has been underway for several weeks. Very little foundry iron is to be had for the first half of the year. An unusual development in bars is a good volume of January buying, Pittsburg, Chicago and Cleveland reporting good tonnages. The sheet and wrought iron pipe mills are not as well employed as other lines, but prices are maintained, and spring demand is counted on to fill all mills, whether consolidation or independent. The structural demand is well sustained and much of the business booked is from buyers who want to make sure of a place in rolling schedules. Wire and wire nails are somewhat firmer in view of the strength of Bessemer pig, billets, and wire rods. It is reported that 300,00 tons of rails for Mexico have been taken by English mills as American mills could not promise the deliveries wanted.

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
429 PARK BUILDING, Jan. 8.

The pig iron market continues to show increased strength and all grades have advanced in price during the past week. Forge and basic iron probably show the greatest advances, as a considerable tonnage was purchased in both lines. The sales of forge iron amounted to about 8,000 tons and for spot shipment as high as $16.50, Pittsburg, was paid while for future delivery the range was $16 to $16.25 per ton. The United States Steel Corporation also purchased some lots of basic iron amounting to nearly 10,000 tons, at $16.50, Pittsburg, which is an advance of 50 cents per ton over the quotations of one week ago. No. 2 foundry for spot shipment is quoted at $16.50 to $16.75 per ton, while one lot was placed for delivery up to July at $16.25 per ton. The Bessemer iron market is exceptionally firm despite the fact that there is very little buying. Owing to the manner in which nearly all the furnaces in the Mahoning and Shenango Valleys are operating it is the general belief that the iron sold up to April 1 cannot be delivered short of June or July, and if this should prove to be the case the furnaces will be unable to sell any portion of their product until that time. Small sales of Bessemer were made during the week at $16.75 per ton and all indications are favorable to an advance.

The coke situation has not eased up to any extent and furnaces not only in this district but in the Valleys are compelled to bank for several days at a time owing to the lack of material. The stocks in the Connellsville region are constantly increasing in size and are already seriously interfering with the proper operation of the ovens. All kinds of premiums are being offered for coke for prompt shipment and one concern whose ovens are in this region has a standing order for all the coke it can ship within the next two weeks at $3.50 a ton for the furnace grade. Even at these prices it is not always possible to secure the proper supply and the West Virginia fields are being largely drawn upon.

The Frick Coke Co. has established a price of $2.25 per ton for furnace coke on contracts running throughout the entire year and it is reported on good authority that practically its entire output of furnace coke has been contracted for through the year. With furnace coke selling at this price and ore on last year's basis it is considered unlikely that pig iron prices will decline materially throughout the entire year. Contracts for foundry coke are being closed at $2.75 to $3 per ton.

In finished lines the market continues firm, buying in both iron and steel bars for delivery during the first half of the year being reported. The plate market is also increasing in strength daily, while sheets and tin plate are in excellent condition for this season of the year. The structural market continues to show unusual strength with all the mills closing a large amount of new business daily.

PIG IRON.—The failure of the merchant furnaces in the Valleys to operate properly owing to the short coke supply is putting shipments of iron further behind every day and the

United States Steel Corporation is still receiving iron that should have been delivered in November, while there is little indication that the December shipments will be made before next month. With the furnaces practically two months behind on shipments at present, and with the coke situation practically unchanged it is doubtful whether the Bessemer furnaces will be in position to take on much additional tonnage short of July 1. The sales of Bessemer during the week have been exceedingly small at $16.75 per ton, Pittsburg. There has been considerable buying of basic during the week with the result that the market has advanced 50 cents per ton. Forge iron shows exceptional strength and as the result of heavy buying has also advanced sharply. Foundry iron for prompt shipment is commanding practically the same price as Bessemer iron. We revise quotations as follows:

Bessemer, Valley	$16 00 to 16 50
Bessemer, Pittsburg	16 75 to 17 25
No. 1 Foundry	17 00 to 17 25
No. 2 Foundry	16 25 to 16 75
No. 3 Foundry	16 00 to 16 25
Gray Forge, Pittsburg	16 00 to 16 50
Chilled Basic, Valley	15 75
Chilled Basic, Pittsburg	16 50

STEEL.—The steel situation remains practically unchanged and sales are limited almost entirely to small lots at prices ranging from $27.50 to $28 per ton. The rod market is firm as the result of heavy buying and prices range from $33.50 per ton for large lots to $34 per ton for small lots.

FERRO-MANGANESE.—There has been no change in the price of manganese and we continue to quote domestic 80 per cent at $52.50 per ton at buyer's mill. Foreign manganese is quoted at $50 per ton.

SPELTER.—The spelter market continues firm and prime Western grades are held at 4.25c to 4.30c, Pittsburg.

MUCK BAR.—Muck iron continues to rule fairly strong and several sales of 200 ton lots have been reported at $29.25 to $29.50 per ton.

SKELP.—The demand for skelp, both iron and steel, continues only fair and we quote grooved and sheared iron skelp at 1.80c to 1.85c and steel skelp at 1.75c.

RAILS AND TRACK MATERIAL.—It was decided during the past week to postpone operating the Ohio plant of the National Steel Co. at Youngstown, O., on rails until March 1, owing to the heavy demand for billets and tin bars. Quotations are unchanged as follows: Standard sections, 50 pounds and over, in lots of 200 tons and over, $28; car lots and less than 200 tons, $30; less than car lots, $32; light rails, 8 pounds, $42; 12 pounds, $38; 16 pounds, $35; 20 pounds, $34; 25 to 40 pounds, $32. Track material: Spikes, 1.95c to 2c; track bolts, square heads, 2.40c; hexagon heads, 2.55c; fish plates, 1.50c to 1.60c.

PLATES.—The plate situation is showing increased strength and all the mills have from three to four weeks' business on their books. Prices are being firmly maintained as follows: Tank plate, ¼-inch thick and up to 100 inches in width, 1.60c at mill, Pittsburg; flange and boiler steel, 1.70c; marine, ordinary firebox, A. B. M. A. specifications, 1.80c; still bottom steel, 1.80c; locomotive firebox, not less than 2.10c; and it ranges in price to 3c. Plates more than 100 inches wide, 5 cents extra 100 pounds. Plates 3-16 of an inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra; No. 9, $5 extra. These quotations are based on carload lots, with 5 cents extra a hundred pounds for less than carload lots. Terms, net cash in 30 days.

BARS.—There has been considerable buying of iron and steel bars during the week and the tonnage placed with local mills is estimated at fully 40,000 tons. Deliveries, however, continue bad owing to the freight congestion. Prices are unchanged as follows: Common iron bars, 1.50c, Pittsburg, for Western delivery, and 1.55c, Pittsburg, for Eastern delivery; refined iron bars, 1.75c and upwards; Bessemer steel bars, 1.50c; open-hearth, 1.60c; plow beams and cultivator beams, 1.50c, net; channels, angles, zees and tees, Bessemer under three inches, 1.60c; over 3 inches, 1.70c. Hoops and bands are quoted at 1.90c, full extras.

PIPES AND TUBES.—The concessions that are being made by the independent manufacturers of merchant pipe and casing are not disturbing the market to any considerable extent. The demand this month has been reported normal and entirely satisfactory. Discounts to consumers, Pittsburg, are as follows:

MERCHANT PIPE.

	Blk. Per cent.	Galvd. Per cent.
⅛ to ⅜ and 11 to 12 inches	61	48
½ to 10 inches	68½	56

BOILER TUBES.

Steel.

	Per cent.
1 to 1¾ inches	47½
2¼ to 5 inches	65¾
1¾ to 2¼ and 6 to 13 inches	60

Iron.

	Per cent.
1 to 1¾ and 2½ inches	43½
1¾ to 2¼ inches	43
2¼ to 13 inches	53

CASING.

	S. and S. Per cent
2 to 3 inches	58
3¼ to 4 inches	63
4¼ to 12¾ inches	65

SHEETS.—While the independent mills are beginning to meet the quotations of the American Sheet Steel Co. the market is showing no signs of weakness and the mills of the American Sheet Steel Co. are reported to be carrying orders on their books for fully three months' business. Black sheets in carload lots to consumers are held as follows: Nos. 10 and 12, 2.40c to 2.50c; 14 and 15, 2.50c to 2.60c; 16, 2.60c; 18 and 20, 2.70c to 2.80c; 22 and 24, 2.80c to 2.90c; 26, 2.90c to 3c; 27, 3c to 3.10c; 28, 3.10c to 3.20c; 29, 3.25c to 3.35c; 30, 3.35c to 3.45c. Galvanized sheets are quoted at 70 and 5 off in carload lots; less than carload lots, 70 off.

STRUCTURAL MATERIAL.—For the winter season the amount of new business now being closed by the mills is unusually large and the market continues to rule very firm. Quotations are unchanged as follows: Beams and channels, 3 to 15 inches, 1.60c; 18 to 24 inches, 1.70c; tees, 1.65c; zees, 1.60c; angles from 3 to 6 inches, 1.60c; universal mill plates, 1.60c.

WIRE AND WIRE NAILS.—Both the wire and wire nail markets are showing considerable strength and prices are somewhat firmer. Only in very large lots can contracts for wire nails be closed at $2.10, while the usual quotation in ordinary lots is $2.15 per keg. Plain wire has advanced accordingly. We revise quotations as follows: Single carloads of wire nails to jobbers at $2.10 to $2.15 and less than carloads at $2.20 to $2.25; plain wire, carload lots, is quoted at $2.15 to $2.20 to jobbers and $2.25 to $2.30 to retailers; painted barb wire, $2.60 in carload lots to jobbers, and 2.70 to retailers; galvanized barb wire, $2.85 to $2.90 in carload lots to jobbers, and $3 to retailers. Cut nails are quoted at $2.05, Pittsburg, in carload lots, and $2.10 to $2.15 in less than carload lots, 2 per cent off in 10 days.

MERCHANT STEEL.—The announcement of the new list of prices on cotton-ties last week by the largest producer has resulted in a large amount of inquiry and considerable new business. We make the following quotations: Cotton ties, in lots of 10,000 bundles and over, 80 cents per bundle; less than 10,000 bundles and over 2,000 bundles, 83 cents per bundle; for 2,000 bundles and less, 86 cents per bundle. All prices are quoted at mill, Pittsburg, full freight added to place of delivery. These prices are for delivery up to April 1, for preferred delivery ½ cent extra per month is charged. Turned, cold rolled and ground shafting, 60 per cent off for car lots and 55 per cent off for less than car lots; tire steel in carload lots and over, 1.60c; less than carload lots, 1.75c to 1.80c. Toe calk is sold at 1.70c, in large lots, and in small lots as high as 1.85c. Tool steel is held at 7c and upwards, according to quality.

OLD MATERIAL.—The demand continues fair and for heavy melting stock is reported large. Despite the advancing pig iron market the price of old material remains steady. Our quotations, gross tons, are as follows: Heavy melting stock, $17 to $17.25; low phosphorus melting stock, $18.25 to $18.50; steel rails, $17 to $17.25; busheling scrap, $13.50 to $14; No. 1 wrought, $17.25 to $17.50; iron rails, $23 to $24; cast borings, $8.25 to $8.50; cast scrap, $14 to $14.25.

COKE.—The announcement that the largest producer of Connellsville coke would only take contracts for furnace coke running through the entire year was a surprise to the furnace operators, but it can be stated that practically the entire output of furnace coke of the Connellsville region has already been closed for the year 1902 at $2.25 per ton. Connellsville foundry coke for delivery the remainder of the year is quoted at $2.75 to $3 per ton. For the week ending Saturday, Dec.

28, the output of the Connellsville region as given by the Connellsville *Courier*, fell off 62,387 tons, owing to the holidays. The total was 170,241 tons, while the shipments amounted to 8,505 cars, an increase over the previous week of 1,075 cars.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
934 MONADNOCK BLOCK, Jan. 7

Very little pig iron is to be had in this market for delivery in the ensuing six months, beyond that which is already contracted for, and there is every prospect that a considerable portion of this will not be delivered unless speedy relief comes in the shape of more cars and coke. All the large dealers have withdrawn from the market, having no iron for sale for delivery in this period, and the only contracts that are being booked are those that call for shipment in the last half of the year. As an indication of the decrease in production, resulting from the coke and car famine one seller who probably has suffered less from these causes than any other concern in this territory, reports that in December they fell 20,000 tons behind specifications. Railroads are beginning to make better promises as to the supply of cars and coke for the future, and it is quite possible, now that the heavy holiday traffic is over, that they will be able to fulfill them. Two local furnaces, the Calumet at South Chicago, and the Mayville, at Mayville, Wis., were put in blast last week, the owners having secured enough coke to last them about two weeks. There is no assurance, however, that these furnaces will be continued in operation beyond this time, as the coke was secured with great difficulty and at a price which allows little profit to the furnaces.

The bar iron market is very firm, there being no lack of business. Nearly all consumers have exceeded the amount of their contracts, and at different times have come into the market for more material. Mills farther east have also booked several thousand tons of standard rails for delivery late in the year, and the local manufacture of plates reports a decided improvement in the situation. A large tonnage has been booked by structural mills, and several big buildings in this city are being figured on.

PIG IRON.—Buying in the past week has been confined mainly to small lots, consumers disregarding previous contracts and placing orders wherever they can get iron. There is no lack of business being offered but most of it cannot be handled as all the furnaces are practically sold up for the ensuing six months. Some Southern furnaces have a little No. 2 soft and No. 3 foundry for sale, and this is rapidly being taken up. Nearly all the business that has been booked thus far this year has been for delivery in the last half, and though both buyers and sellers are reluctant to contract much for this period, a good tonnage has been placed. Two local furnaces were put in blast last week, the Calumet at South Chicago and the Mayville at Mayville, Wis., enough coke having been scraped together to last them about two weeks. Though the supply of cars and fuel is far from adequate, railroads are making better promises of a larger supply in the near future, now that the holiday traffic is over. We neglected to report last week that the Sloss-Sheffield furnaces had advanced prices 50 cents a ton, and had also withdrawn from the market for the next six months. We quote prices as follows:

Lake Sup. Charcoal	$18 50 to $19 00	Southern Coke No. 4	$14 15 to $14 90
Local Coke Fdy. No.1	16 00	Southern No. 1 Soft	15 65 to 16 40
Local Coke Fdy. No.2	15 50	Southern No. 2 Soft	15 15 to 15 90
Local Coke Fdy. No.3	15 00	Southern Gray Forge	14 15 to 14 90
LocalScotchFdy.No.1	16 00	Southern Silveries	16 15 to 17 65
LocalScotchFdy.No.2	15 50	Jackson Co. Silveries	17 00 to 17 50
LocalScotchFdy.No.3	14 50 to 15 00	OhioStrong Softeners	17 00 to 17 50
Southern Coke No. 1	15 90 to 16 65	Alabama Car Wheel	20 50 to 21 00
Southern Coke No. 2	15 15 to 15 90	Malleable Bessemer	16 50 to 17 00
Southern Coke No. 3	14 65 to 15 40	Coke Bessemer	18 00 to 18 50

BARS.—Local bar iron sellers report a brisk business, and that prices are very firm. Generally there is a falling off about this time of the year, but such has not been the case so far. The local interest is sold up for six months on steel bars, but Pittsburg interests have booked a large tonnage. We quote iron and steel, 1.65c Chicago; out of store, 1.90c to 2c.

SHEETS.—All jobbers report an excellent demand, and the supply of sheets coming into this territory is far from adequate. We quote No. 27 black, 3.50c, and galvanized, 70 per cent to 70 and 5 per cent.

BILLETS.—While it is practically impossible to get billets in this market, we quote $31 to $33 for Bessemer, and $33 to $35 for open-hearth.

STRUCTURAL STEEL.—The lack of cars is seriously affecting the delivery of material into this territory, and mills are many months behind in shipments. New business is plentiful and a good tonnage has been booked. Several large buildings in this city are being figured on, and specifications for the same will soon be ready. Heavy sections of beams can be secured in four to six weeks; light sections and angles in three months; universal plates, six to eight weeks, and sheared plates in four weeks. We quote mill shipments, carload lots, as follows: Beams, 15 inches and under, 1.75c; 18 inches and over, 1.85c; angles, 6x6 and under, 1.75c; over 6x6, 1.85c; plates, 1.75c, base; tees, 1.80c; zees, 1.75c; small lots from store, ½c to ¾c higher; beams and channels from store, ½c to ¾c per pound higher.

RAILS AND TRACK SUPPLIES.—Mills in Pennsylvania have booked orders for the delivery of several thousand tons of standard rails late in the year. Inquiries are constantly being made, but owing to the fact that nearly all the mills are sold up for the entire year, these do not develop beyond the inquiry stage. Light rails and track supplies are in good demand. We quote as follows: Standard rails, $28; light sections, $34 to $36, according to size; out of store, $40 to $44; splice bars, 1.70c to 1.80c; spikes, 1.95c to 2.05c; track bolts, and hexagon nuts, 2.80c to 2.90c, out of store, 2.90c to 3c; square nuts, base, 2.65c to 2.75c; out of store, 2.75c to 2.85c.

MERCHANT STEEL.—Though consumers are specifying heavily against contracts, mills are unable to ship all the material needed, owing to the shortage of cars. Plenty of new business is offered, but little is being booked, as manufacturers have contracted for all they can make for several months. We quote mill shipments, Chicago delivery, as follows: Smooth finished tire steel, 1.85c to 2c; open-hearth spring steel, 2.25c to 2.50c; toe calk, 2.40c to 2.60c; sleigh shoe, 1.65 to 1.80c; cutter shoe, 2.40c to 2.60c; ordinary tool steel, 6c to 7c; specials, 13c and upwards; less than carload lots, 5 per cent to 10 per cent higher.

PLATES.—There is a brighter outlook, the local interest reporting that the demand has improved. Our quotations follow: Tank steel, base, ¼-inch, 1.75c to 1.85c; flange steel, 1.90c to 2c; marine steel, 1.95c to 2.10c; firebox steel, ordinary, 2c to 2.10c; special, 2.25c and upwards. Jobbers are selling from store according to size, as follows; Tank steel, 1.90c to 2c; flange steel, 2.10c to 2.25c; marine steel, 2.40c to 2.50c; firebox steel, ordinary, 2.40c to 2.50c; special, 2.50c and upwards.

CAST IRON PIPE.—There is a very good inquiry for the delivery of material this year, and some small contracts have been booked. We quote as follows: 4-inch water pipe, $29; carload lots, f. o. b. Chicago; 6-inch water pipe, $28; 8-inch and larger sizes, $27; gas pipe, $1 per ton higher than above prices.

MERCHANT PIPE.—Jobbers report a good demand for boiler tubes. Little business is being offered in merchant pipe, this being the dull season.

MERCHANT PIPE, RANDOM LENGTHS.

	Black Per cent.	Galv. Per cent.
⅛ to ⅜ and 11 to 12 in.	59.5	46.5
¼ to 10 inches	67	54.5

BOILER TUBES.

	Steel Per cent.	Iron Per Cent.
1 to 1¼ in.	40	35
1¼ to 2¼ in.	47½	37½
2¼ to 5 in.	57½	47½
6 in. and larger	45	40

WIRE AND WIRE NAILS.—There is still an excellent demand for all kinds of wire products, and manufacturers have no difficulty in selling their entire output. We quote nails in small lots to the retail trade, $2.25; painted barb wire, $2.70 to $2.80, and galvanized wire, $3 to $3.10.

COKE.—There is no change in the situation, the supply of coke being entirely inadequate to meet the demand. We quote Connellsville coke $5 to $5.25, though higher prices can be secured for immediate delivery.

OLD MATERIAL.—All the large consumers are out of the market at the present time, but considerable material has been

sold to other concerns. We advance some of our quotations and quote as follows:

Old iron rails	$21 00 to $21 50	Relaying rails	27 00 to 28 00
Old steel rails, 5 ft. and up	20 25 to 21 00	Old wheels	$16 50 to $17 00
Old steel rails, mixed	14 00 to 15 00	Heavy melting steel	14 00 to 14 50
		Mixed country steel	10 50 to 11 00

The following are selling prices per net ton:

No. 1 R. R. wrought	$15 00 to $15 50	Steel Axles	$18 50 to $19 00
No. 2 R. R. wrought	13 25 to 13 75	Cast borings	5 25 to 5 75
Dealers' forge	13 00 to 13 50	Wrought turnings	10 00 to 10 50
No. 1 busheling	11 00 to 11 50	Iron axle turnings	12 00 to 12 50
No. 1 R. R & mach. cst.	11 75 to 12 25	Steel axle turnings	10 50 to 11 50
Railway malleable	12 00 to 12 50	Stove plates	8 50 to 9 00
Country malleable	11 50 to 12 00	Old iron splice bars	16 50 to 17 00
Iron axles	21 00 to 21 50		

CLEVELAND

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING Jan. 8

The figures covering exact production, possible production in the coming year, estimated consumption in the past year, and other data relating to the Lake Superior iron ore trade have not been completed as yet. But it is probable the meeting on old-range Bessemer ores will be held within another week or 10 days. It is several years since any agreement was maintained on old-range non-Bessemer ores, the usual objection being that the competition of Southern iron made it impossible for the Northern furnaceman buying ores for foundry iron to pay more than a very moderate profit on his raw materials. But in such a year as 1901 and under such conditions as are promised for 1902 the ability of furnacemen to pay such a profit as pig iron is now winning is not in question, and the probability is greater that something might be done to bring producers of non-Bessemer ores together. Some sales have been made, but they are limited to a single group of old-range mines and it is believed would not militate against the establishment of a price giving a somewhat better return than last year's.

When the mines of the United States Steel Corporation are left out of the account and those of other steel companies, and further deduction is made of ores sold under contracts covering a period of years, it is probable that considerably less than 4,000,000 tons of all grades of Lake Superior ores remains to be disposed of in the open market, a good proportion of this going to producers of foundry, forge and basic irons.

PIG IRON.—The difficulty of getting iron for anything like prompt shipment is one that confronts the foundryman at every turn. The fact is that no great amount of iron is to be had for delivery in the first half of the year—that is of the popular irons which always find ready sale. The question whether to buy for the second half has already been decided in the affirmative by some buyers and their number is increasing. Furnacemen are making quotations for the entire year on the basis of current prices. There is a semi-speculative feature connected with these purchases for the latter portion of the year, but buyers have little fear that work will not hold out. They reason that as some furnaces are evidently oversold for the first half, in view of their present short production due to the coke scarcity, the assurance that the desired grades of iron will be furnished him through the year is of some consequence to the foundryman. The advance of Southern iron squarely to $12 Birmingham makes the delivered price $15.70 in Cleveland. Some Valley furnaces are quoting $15.50 at furnace for this grade and $16 for No. 1, making Cleveland prices $16.25 and $16.75, respectively. Forge iron both Northern and Southern is scarce. We quote $15.25 to $15.50 at Valley furnace. A sale is reported at the former figure. Chilled basic has sold as high as $15.75 at Valley furnace and while $15.50 to $15.75 is quoted, little is to be had at either price. We quote Bessemer iron at $16 to $16.25 Valley furnace, the business being chiefly in small lots. We quote as follows:

Bessemer	$16 50 to $17 00	Scotch No. 1	$16 50 to $17 00
No. 1 Strong F'dry	16 50 to 17 00	Scotch No. 2	16 25 to 16 50
No. 2 Strong F'dry	15 25 to 16 50	Gray forge, Valley	15 25 to 15 50
No. 3 Foundry	15 75 to 16 00	LakeSuperior charc'l	18 00 to 18 50

FINISHED MATERIAL.—Bars have shown more activity in the past week, orders for several thousand tons being booked. Contract buying was not expected thus early, but it is evident that the calendar is to have as little to do in checking buyers as it had in early 1899. The delay in getting material from the mills because of the railroad failure has pointed to a congestion in the mills in spring owing to the crowding forward of specifications when outdoor operations begin. It is evident that some buyers are already preparing for spring business, inventory being finished and any relaxation of prices being plainly out of the question. Pittsburg interests appear somewhat more urgent for bar business than local and Valley mills. We quote 1.58½c Cleveland on iron in carload lots; 1.58½c Cleveland on Bessemer steel bars and $2 a ton higher for open-hearth. Out of store bars are sold at 1.75c to 1.85c. The sheet trade shows no change in price. Lighter gauges have shown somewhat better delivery since the movement of stove-pipe material by vessel up the lakes has ceased, but the intermediate gauges are still behind scheduled deliveries. On mill shipments the following quotations are made f. o. b. Cleveland: No. 24, 2.90c to 3c; No. 26, 3c to 3.10c; No. 27, 3.10c to 3.20c, with usual extras for less than carload lots, etc. Round-lot quotations from store are as follows: No. 10, 2.35c to 2.50c; No. 12, 2.45c to 2.60c; No. 14, 2.55c to 2.70c; No. 16, 2.95c to 3.10c; No. 18, 3c to 3.15c; No. 20, 3.05c to 3.20c; Nos. 22-24, 3.15c to 3.30c; Nos. 25-26, 3.25c to 3.40c; No. 27, 3.35c to 3.50c; No. 28, 3.45c to 3.60c. The above are for one pass through cold rolls. For full cold rolled the extra is .10c. Galvanized sheets are quoted 70 to 70 and 5 off list. On some belated deliveries of galvanized to selling houses some concessions have been made recently in view of the season. Structural material continues strong and active, and the outlook is for the operation of the mills to their utmost in the coming months. We quote beams and channels up to 15 inches at 1.70c, Cleveland. Tank plates are likewise quoted 1.70c and mills are fairly active. Wrought pipe is quiet at this season, but buyers have not succeeded in getting such concessions as are looked for at this time of year.

OLD MATERIAL.—There is a slight falling off in the volume of business as compared with the latter half of the preceding month, but prices are well maintained, and there is no indication of any recession. A brisk demand exists for car wheels, but as is well known, this branch of the scrap business is to a very small extent in the hands of dealers. Current quotations are as follows, all in gross tons:

Old steel rails, rolling mill lengths	$17 00 to 18 00
Old steel rails, short lengths	15 75 to 16 50
Iron rails	21 00 to 22 00
No. 1. railroad wrought	16 50 to 17 50
Mill scrap	14 50 to 15 00
No. 1. machine scrap	13 75 to 14 25
Machine shop turnings	12 50 to 13 00
Cast borings	6 50 to 7 00
Grate bars	8 50 to 9 00
Sheet iron	9 00 to 10 00
Stove plate	10 00 to 10 50
Car wheels	15 50 to 16 50

CINCINNATI.

Jan. 7.

Although the announcement was made a week ago that the Southern furnaces that had been holding back from advancing the price on pig iron had finally joined the others, one important interest did not formally advance until this week. It was generally understood that this interest would advance when another large company should do so. There was some selling at $11.50, but this was soon followed by orders to the company's agents to sell no more at these figures. The market is now $12 Birmingham. The advance, it is said, by furnacemen and handlers was made by consumers themselves. There is no doubt that the large producers have sought to keep the market from advancing too rapidly, recognizing that a too rapid advance is good neither for the consumer nor the producer.

The buying in all branches of the iron trade has been very satisfactory since the opening of the new year. Producers would be glad if they could get more nearly caught up with their orders and many would welcome an absolute cessation of business until they could get their business well in hand were it not for the fact that a cessation could be brought about by one thing only and that is a change in conditions.

The manufacturers of finished product and special shapes have had it harder than any other branch. Rolling mills are working hard to keep from getting any farther behind. Architectural iron makers are becoming experts at making promises. In some branches of the trade there is being added to all other troubles the scarcity of labor. Among the local foundries this is true. They have had hard work in keeping

going with iron delivered to them only as delinquencies and they now have in addition the difficulty of getting molders as they need them.

PIG IRON.—Buying of pig iron has gone right ahead and there are few furnaces that can furnish anything in the way of large amounts of iron during the first six months without a good deal of squeezing. Most are sold out of No. 4 foundry and many cannot offer any No. 3. Gray forge is sought in vain for early delivery and an example of this is furnished in the instance of a large rolling mill that had to take 2,000 tons of No. 3 for puddling in the face of absolute inability of the furnace to give gray forge.

The advance of 50 cents a ton noted last week is made general this week and has no effect on the buying one way or the other. Southern furnaces are probably in a slightly better shape as regards coke, but if it is not one thing it is another and there is now a scarcity of labor with many of them following upon the holiday festivities and this with other difficulties has caused more of them to bank. There have been booked some notable orders for Southern irons in the past week. One for 10,000 tons of No. 3 foundry was placed by a pipe foundry. Two were given for Southern basic, one for 6,000 and the other for 4,000 tons, while there has been a good run of orders of 1,000 tons on down. One local iron firm had orders in its Monday's mail for 15,000 tons, no one being of very large proportions. Following are prices f. o. b. Cincinnati:

Southern Fdy. No. 1	$15 25 to $15 50	Gray Forge	$13 75 to $14 00
" " 2	14 75 to 15 00	Northern Fdy. No. 1	17 10 to 17 35
" " 3	14 25 to 14 50	" " 2	16 60 to 16 85
" " 4	13 75 to 14 00	Southern C.W. iron	18 75 to 19 25
So. Fdy. No 1 soft	15 25 to 15 50	Malleable coke iron	16 10 to 16 35
So Fdy. No. 2 soft	14 75 to 15 00		

FINISHED MATERIAL.—The demand for steel bars and in fact all shapes and sizes of finished material from steel has been such that, coupled with the difficulty experienced by many mills in getting steel, the market is very firm with talk of an advance. There is a good inquiry for material of all kinds and deliveries continue to be quite slow. In structural iron it is probably more marked than in other lines, and here it is felt very keenly. One large machine tool concern recently bought a tract adjoining its plant on which it intends to erect a large addition. Everything has been in readiness for beginning the work, but the trouble in getting structural material is so great that the company sees no immediate relief from the overworked and overcrowded condition of its factory in spite of the decision to build the new space. Another iron working concern that has been contemplating building for some time found it out of the question to expect to get iron in any ordinary length of time and instead of the brick and steel structure planned for there has been put up a temporary shed of wood to accommodate the most pressing needs.

Manufacturers have been buying bars and sheets and plates in a way that would indicate that they had delayed a good deal of this sort of business until after the first of the year. They are asking as early delivery as possible, but are not surprised at the promises made which are for long delivery only. They are getting used to this sort of thing.

There is no change in prices. Iron bars are 1.62c on the basis of 1.50c Pittsburg; and the same price rules for steel bars. Angles are 2c; plates, 1.85c to 1.90c; sheets, No. 28, 3.35c to 3.40c; No. 12 blue annealed, 2.35c.

OLD MATERIAL.—The demand for scrap iron has been good and the firmness and advances in the pig iron market resulted in a corresponding firming up of prices on some kinds, especially rails and axles. There have been a few purchases made of importance and a steady delivery of old material to the mills. Prices at Cincinnati are as follows:

Old No.1 Wrought Railroad, net tons	$ 15 50 to 16 00
Cast Machine and Foundry, net tons	12 50 to 12 75
Old Iron Rails, gross tons	21 25 to 21 50
Old Steel Rails, gross tons	18 00 to 18 25
Old Short Lengths, gross tons	15 00 to 15 25
Old Iron Axles, gross tons	21 00 to 21 50
Old Iron Car Wheels, gross tons	16 00 to 16 25
Stove Plates, gross tons	9 75 to 10 00
Wrought Turnings, net tons	11 50 to 11 75
Cast Borings, net tons	5 50 to 6 00

PHILADELPHIA.

Jan. 7.

Although the market has not resumed the condition which preceded the holidays, there appears in certain quarters a bullish sentiment which would tend to show that prices are working towards a higher level. About the only thing back of this is the strength shown by pig iron and while there is a scarcity of this material, it is a question if this would not altogether disappear if transportation facilities were what they should be. While there is some doubt as to the ability of sellers to maintain permanently higher prices, it must also be conceded that there is a still smaller chance for a decline during the next three or four months, as stocks amount to practically nothing and should business continue at the rate, the majority expect it to do, slightly higher values would not be entirely unexpected.

PIG IRON.—A disposition is being shown to take iron for more extended deliveries, the price paid ranging from 50 to 75 cents per ton above sales made a month ago. Added premiums are obtained for urgent shipments. Extremely favorable conditions may be said to rule the market, and although it is in some cases extremely difficult to obtain the exact figures at which transactions are made the following prices will fairly represent quotations for Philadelphia and nearby points: No. 1 X foundry, $17.25 to $17.50; No. 2 X foundry, $16.50 to $16.75; No. 2 plain, $15.75 to $16; standard gray forge, $14.50 to $14.75; ordinary gray forge, $14.75 to $15.25.

FINISHED MATERIAL.—With the exception of structural material, in which deliveries are very much behind and exceedingly difficult to obtain, the extreme urgency has disappeared and makers are in a fair position to give satisfactory deliveries. The plate mills are fully employed with orders coming in quite freely. In bars there is some irregularity in the activity of the mills, although the outloook is fair. Prices are steady and quoted about as follows for seaboard and short distance deliveries: Plates, ¼-inch and thicker, 1.75c to 1.80c; bars, iron or steel, 1.62½c to 1.70c; angles, 1.75c to 1.85c; beams and channels, 1.75c to 1.85c.

OLD MATERIAL.—There are no changes of any note to record, bids and offers for deliveries in buyer's yard being about as follows: Choice railroad scrap, $20.50 to $21; No. 2 light scrap, $12.50 to $12.75; machinery cast, $14 to $14.50; heavy steel scrap, $18 to $18.50; old iron rails, $21 to $21.50; wrought turnings, $13 to $13.25; cast borings, $8 to $8.50; old iron axles, $24.50 to $25; old steel axles, 20 to $21; old car wheels, $16.50 to $17.

Metallurgy of Cast Iron—Third Edition.

THE METALLURGY OF CAST IRON: A complete exposition of the processes involved in its treatment, chemically or physically from the blast furnace through the foundry to the testing machine. By Thomas D. West. Third Edition: Cleveland Printing & Publishing Co., Cleveland. Price $3 00.

The first edition of this work of Mr. West appeared in January, 1897, and was designed to record some of the advances that had been made in the handling of cast iron, and some of the efforts toward greater certainty and uniformity in operations involving cupola metal—much of the matter covering questions that had come up as the fruit of the foundrymen's association movement. In spite of criticisms provoked by the introduction of matter pertaining to blast furnace practice, which is not Mr. West's special field, the work has had wide circulation. After five years the author now presents a third edition, a second, practically a duplicate of the first, having come out in the first year after the original publication.

The third edition is a 12mo. of 627 pages and involves such changes from the original as make it in important particulars a new work. Thirteen chapters treating of cupola practice, published in the first two editions, were transferred to West's "Molder's Text Book." Twenty chapters have been added, dealing largely with the melting, mixing and testing of cast iron, and embodying considerable research and experiment by the author. Mr. West has had a prominent part in the work done by committees of the American Foundrymen's Association in establishing standards for test bars of cast iron, and he develops this portion of the work with much detail and fullness of illustration. The preparation of standardized drillings to assist chemists in obtaining accurate results in analyses of pig iron and cast iron, is another work in which Mr. West had an important part. The volume before us is designed, in short, to bring down to date the work that has been done in cast iron in the United States.

THE IRON TRADE REVIEW

Devoted to the Machinery, Metal-Working and Foundry Trades, and Iron and Steel Manufacture.

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JANUARY 9, 1902.

STEEL SUPPLY FOR INDEPENDENT MILLS.

The problem of steel supply is still before the finishing mills that depend upon the market for billets, slabs, or sheet bars. In sheets, for example, there has been a large increase in producing capacity in the past year, much of it in mills with no connected steel plant or any guaranteed source of supply. Similarly in wrought pipe and tubes there has been an increase in finishing capacity without corresponding provision in new steel plant. The demand of the leading wrought pipe interest for skelp, in addition to its own production, could easily absorb the output of independent skelp mills, even with the increased operation of the puddling outfit of the country. Wire mills depending upon the market for billets have found the situation a serious one under the developments of the past two months. An Illinois concern with its own rod mill was compelled to shut down this department at the close of the year and go into the market for rods, because the steel company from which it had been accustomed to buy billets could no longer supply it. The demand upon the steel companies of the United States Steel Corporation from finishing mills of other constituent companies has been such that there was nothing to offer the independent mills starting with the billet or sheet bar. Even those concerns assured of a supply of steel under sliding scale contracts have had their cost raised by the advances in Bessemer pig iron and thus have been at a disadvantage in the market in competing with producers who carry hot steel through to the last finishing pass.

While December brought further record-breaking outputs at steel works, these were only in response to the more insistent demand of related finishing concerns, the scarcity of material in the market growing more acute. Importations will bring some relief, but even at the low prices prevailing abroad imported steel leaves little profit at the present level of domestic prices for finished material. The recourse of the independent mill will naturally be the building of open-hearth plant, and new development in this direction is to be expected. Meantime an extensive increase in steel-making and finishing capacity will be undertaken by the largest interests, and when the present pace slackens the small mill may have to face a generally lower level for finished products. The main fact in this connection is that while this may not come this year, it is sure to some. Eventually some solution of the problem may come through the independent furnace interests in the Central West. The long discussed steel plant, giving an outlet for the product of th merchant furnaces when the United States Steel Corporation no longer needs it, may be welcomed both by furnacemen and the owners of detached finishing mills.

COMBINES AND THE CHANCE OF THE INDIVIDUAL.

The possibility that he will at some time handle the details of his own business is an incentive to the ambitious effort of many a workman. It is a hope that in most instances must fail of realization, so far as the attainment of proprietorship is concerned, but the anticipation begets self-reliance and acts as a powerful stimulus to the man on the ladder of promotion. The majority of the manufacturing industries of today that have any history were founded by just such energetic workmen, and with the proper chance for its exercise, the same spirit would doubtless continue to act as leaven in the world of labor. Vastly greater effort is undoubtedly required to meet the changed conditions. Competition has forced a high standard of manufacturing ability, and the power to meet competitive prices depends upon the financial resources to improve the means of production and to pre-empt the available craftsmanship.

The attempt of the workman to become the owner of a plant is least likely to be successful if he propose to manufacture an article requiring a maximum of financial resource and a minimum of skilled labor. As a rule he will lack the first, though measurably able to supply the second. His success, therefore, would be measured by the extent to which his personal equipment meets the requirements of the business. Exceptional cases exist, to which general statements do not apply. The possession of an important patent or process of manufacture lengthens the reach of the workman and furnishes him with a powerful aid in the struggle for supremacy. But instances are to be found where the newcomer in business has undertaken the construction of some familiar machine or tool, that to be made successfully must be made in quantities, with the best equipment, including that personal labor that is usually given by the young manufacturer. Should he select, for example, the manufacture of taps and dies, or any similar produc in which a good article may be produced without the likelihood of patent infringement, he will have an uphill struggle.

Realizing the vast importance of the equipment required in modern industry, many workmen look askance at the growing consolidations. Financial resources are a power not to be lightly estimated, and it may seem the most natural thing to consider these combinations of capital as irresistible in their respective fields. Yet they cannot wholly monopolize the instruments of production, nor be independent of highly skilled labor. The chief characteristic of skill is its

mobility, and the combinations of capital have freely competed for men of talent. If it is no longer so easy for the skilled craftsman to become an employer of labor, his opportunities to find an employer have certainly increased.

It may be but the malice of a former employer of the Amalgamated Copper Co. that prompted his statement that the recent sensational decline in that stock was due to his divulging a knowledge of the real status of copper. Nevertheless, it suggests the power held by many employes, a power that increases in proportion to the growth of the organization.

Some of these consequences of industrial concentration have been best suggested in a recent lecture by Mr. William Kent before the Stevens Engineering Society and reported in the *Indicator*. He traced the effect of improved machinery, high skill, and the application of economy to manufacturing and marketing methods by the following graphic illustration:

"Let us take an imaginary case to illustrate what the coming rearrangement means. Suppose a man bought a pound of wire nails a few years ago in New York City. How many different corporations, firms and individuals entered into the problem of furnishing him this pound of nails? The iron ore was mined in the Lake Superior district by a firm whose office was in Cleveland, O. They contracted with a railroad company to carry it to Duluth, and with the owner of a steamer or sailing vessel to deliver it on the dock at Cleveland. There it was sold to the owner of a blast furnace in Youngstown, through the employment of selling agents, and after much dickering about price.

"The furnace man bought his coke in Connellsville, Pa., paying a good profit, of course, to the owner of the coke ovens, which profit no doubt was large enough to cover the risks of competition with other coke producers and other business risks. The pig iron was sold to a maker of steel in Pittsburg, who turned it into steel billets. These were bought by the wire rod maker at another place in Pittsburg, and were perhaps hauled there by horse and wagon, to avoid the high terminal charges for short distances by the railroad. The wire rods were bought by a nail works in Wheeling, and there made into nails and put into the warehouse. If the market happened to be overstocked with nails they lay there for months. Finally they were sold through a Pittsburg broker to a wholesale dealer in New York, who employed salesmen to distribute them to the retail dealer, who after a while sold them to the final purchaser. Think of the handling and rehandling, the business risks of buying raw material at too high a price, and of overstocking the market and having to sell below cost, of the amount of capital used by the numerous manufacturers, transporting companies and dealers, of the amount of money spent in advertising, and in the employment of traveling salesmen. If the time were the year 1897, when the pound of nails sold for less than two cents, think of the struggles of the several manufacturers to avoid losses, of the reduction of wages, of strikes against such reduction, of the cut-throat competition to sell, which makes profits a vanishing quantity. If the year were 1899 with prices increased over 100 per cent, think of the profits made by those who bought the raw material cheap and sold the manufactured product dear; if the year were 1900, think of the losses sustained by those who were caught with contracts to buy raw material at high prices, and with the sudden decline in demand and in price for the finished article.

"Let us look ahead a few years and see how the situation will be changed. A giant corporation with enormous capital has offices in New York. It owns mines on Lake Superior, railroads to the docks on that lake, steamships carrying the ore to its blast furnaces, steel works, rod mills, and nail works, all located at one place on Lake Erie, steel barges to carry its product through the Erie Canal to its great storehouse on the Hudson river, in New York City, which is part of a vast hardware department store where the product is sold both wholesale and retail. What a saving has been accomplished in human labor, in handling and rehandling in transportation, in the work of salesmen, in advertising, in cost of carrying stocks of material through every stage from the ore to the finished nail.

"This is the industrial revolution that is now impending in the first year of the new century. Shall we complain that its effect will be to destroy the value of hundreds of small iron works and nail mills, that it means less tonnage for railroads, and the discharge of thousands of laboring men, of foremen and superintendents, and of traveling salesmen? The complaint will be a vain one. As well might we complain that the factory system has destroyed the domestic spinning wheel and the household weaving loom, that the locomotive has destroyed the stage coach, that the steel rail has supplanted the iron rail, that the Bessemer converter and the open-hearth has supplanted the puddling furnace. The new industrial and commercial revolution is coming and coming to stay, and in the end will prove as beneficial to the human race as the other revolutions which have preceded it."

It is far from easy to estimate the outcome of the industrial ferment; but whether we say that the progress of combinations will be along lines necessitating less skill on the part of the employe, or whether on lines putting a still higher valuation on the workman, the outcome need not give anxiety. The former leads easily to proprietorship for the skilled artisan, and the latter enhances his reward and puts a premium on eminent ability.

The individual who prepares himself for the position of competitor will be found most useful by the corporation undertaking any highly specialized product. And this dependence will put such a value on the best equipped man that corporate management will often be found preferable to the struggle with the details of private ownership. R. I. C.

IRON AND STEEL EXPORTS.

The November iron and steel exports show something less of a falling off from the corresponding month in the preceding year than have the months immediately preceding. The October tonnage of materials given in our table was 118,000 tons less than that of October, 1900. The November decline was from 113,546 tons to 54,621 tons, or about 60,000 tons. From the following statement it will be seen that billets have fallen to nothing, that rails have measurably held their own, that pig iron has fallen off sharply, and that wire has actually shown an increase:

EXPORTS OF IRON AND STEEL FROM THE UNITED STATES.

GROSS TONS.

	November.		11 Mos. end'g Nov.	
	1900.	1901.	1900.	1901.
Pig Iron	29,573	18,039	257,169	75,810
Scrap	3,900	1,047	47,177	13,598
Bar Iron	3,059	673	10,180	17,669
Wire Rods	2,000	164	9,473	6,173
Steel Bars, not Wire Rods	11,427	1,982	74,926	34,638
Iron Rails	5		5,319	901
Steel Rails	15,491	16,852	341,016	303,232
Billets, Ingots and Blooms	23,872	90	94,717	37,286
Hoop Band and Scroll Iron	834	37	2,818	1,214
Iron Sheets and Plates	1,184	435	8,577	6,419
Steel Sheets and Plates	5,125	420	37,655	22,540
Tin Plates, Terne Plates and Taggers Tin	48	2	139	429
Structural Material	8,934	4,822	63,695	49,089
Wire	5,533	8,955	71,101	79,333
Cut Nails	968	377	10,112	8,738
Wire Nails	1,436	602	25,665	17,135
Other Nails, incl'd'g Tacks	117	131	1,686	1,706
Total	113,546	54,621	1,062,023	664,908

The Youngstown (O.) Steel Casting Co., with a capital stock of $100,000, has been organized. The directors and officers are as follows: E. B. Lawrence, president; Thomas B. Van Alstine, vice president; J. W. Rogers, secretary and treasurer; David Rosser, George Higley, J. R. Long, Arthur Eynon, George E. Rose and Harry Parrock.

DEATH OF JOHN G. SADLIER.

John G. Sadlier, president of the American Foundrymen's Association, and manager of the Springfield Foundry Co. and Fairbanks Machine Tool Co., Springfield, O., was shot and killed on Monday, Jan. 6. His assailant was a molder, formerly in the employ of the company. The man is said to have threatened Mr. Sadlier some years before for discharging him and is referred to in the dispatches as dissipated and half insane.

Mr. Sadlier was regarded in the foundry trade as a practical foundryman of ability and he was elected president of the American Foundrymen's Association at its Buffalo convention in June, 1901, as a representative founder who had risen from the molding floor. He was born in Johnstown, Pa., in

1856 and served his apprenticeship in the Cambria Iron Co.'s foundry. He was foreman successively of the foundries of the Morgan Engineering Co., Alliance, O.; Walker Mfg. Co., Cleveland; Wm. Tod Co., Youngstown, and Buhl Steel Co., Sharon, Pa.

United States Steel Corporation Earnings.

The quarterly meeting of directors of the United States Steel Corporation at New York, Jan. 7, declared the usual 1¾ and 1 per cent dividends. The following statement of net earnings by months was given out: April, $7,356,744; May, $9,612,349; June, $9,294,747; July, $9,580,151; August, $9,810,880; September, $9,272,812; October, $12,205,774; November, $9,795,841; December (estimated), $7,750,000; total, $84,779,298.

As to the December earnings the statement made this explanation: "During the close of lake navigation from December to April, inclusive, the earnings of mining and transportation companies are, of course, diminished." The sinking fund on United States Steel Corporation bonds and the bonds of subsidiary companies consumed $2,263,292, and depreciation, reserve and contingent funds and improvements $9,695,702. The sum of $11,400,000 was paid in interest on bonds for nine months, and $42,005,807 was paid out in dividends. The balance available for surplus or new construction amounted to $19,414,497.

C. W. Jackson, formerly connected with the Davis Coal & Coke Co. of Philadelphia, has been placed in charge of the coke department of Rogers, Brown & Co., with headquarters at Chicago.

It is stated that the American Locomotive Co. has sufficient orders booked ahead to keep all the plants of the company running to their full capacity until Feb. 1, 1903, and the volume of business on the books aggregates about $28,000,000.

BLAST FURNACE AND STEEL WORKS RECORDS.

Unusual Output at Ohio Steel Works.

(Special Telegram.)

PITTSBURG, Jan. 8.—During the month of December the Ohio plant of the National Steel Co., Youngstown, O., broke all previous steel production records. The total of ingots made was 56,098 tons; ingots rolled, 55,042 tons; finished billets, tin and sheet bars, 47,774 tons. On Dec. 12 the converting mill turned out 2,780 tons and the finishing mill 2,440 tons.

Long Run of Edgar Thomson Furnace H.

Furnaces E and H of the Edgar Thomson group of the Carnegie Steel Co. at Braddock, Pa., have made some phenomenal pig iron records of late. During December the average daily output of furnace E of this group amounted to 630 tons, the output for the month amounting to 19,554 tons. This record is remarkable when it is considered that the furnace is only 90 feet 9 inches high, and has a 22-foot bosh. About 1,800 pounds of coke was used for every ton of metal. This furnace has been operating on its present lining since Dec. 5, 1900. Furnace H holds the record for continuous operation on one lining and also the output record, proving that the fast operation of furnaces does not necessarily destroy the lining, as has been claimed by English iron masters. The furnace has been operating on its present lining since March 13, 1894, or almost 7 years and 10 months. In that time this furnace produced 1,088,869 tons, which is the greatest output yet recorded on one lining of any furnace. The report that this furnace produced more than 900 tons during a 24-hour run recently, is denied by the management. The best furnace record for a 24-hour run is held by one of the new National Steel Co. furnaces at Youngstown, O., which recently produced 806 tons.

A Converting Works Record at Joliet.

Joliet Works of the Illinois Steel Co. began the year by breaking previous records in the converting works and billet mill department. On January 1 the converting department, working 24 hours, produced 228 heats and 2,338 tons, as against 225 heats and 2,294 tons, the previous record. The billet mill produced 2,069 tons against a previous record of 2,032.

New Coal and Coke Supplies for the Steel Corporation.

Judge E. H. Gary of the United States Steel Corporation announced on Jan. 2 that the properties heretofore secured by the managers of the Pocahontas Coal Syndicate, consisting of about 300,000 acres of fuel and coking coal, has been sold to the Pocahontas Coal & Coke Co., which is controlled by the Norfolk & Western Railway Co., and that 50,000 acres of these lands had been leased on a royalty basis to companies whose capital stock is owned or controlled by the United States Steel Corporation. Within the near future there will be constructed 3,000 modern coke ovens, together with necessary railroads, electric plants, stores and other improvements.

The United States Steel Corporation by this lease secured sufficient coal to provide, on the present basis of consumption for about 30 years. This, with the Connellsville region, should furnish coke for upward of 60 years.

The United States Steel Corporation has also arranged to produce its own supply of coal in the Pittsburg district by the development of 50,000 acres, worth approximately $10,000,000. The work of development will be started at once by a subsidiary company, the National Mining Co., of which President Thomas Lynch of the H. C. Frick Coke Co., is the head. The National Mining Co. will open its first mine in the Panhandle field, 14 miles from Pittsburg, in the Chartiers valley, where 7,500 acres of coal property will be developed.

The Wellman-Seaver Engineering Co. of Cleveland marks the turn of the year by sending to its friends an illustrated volume of the flat sketch book description, containing some clever caricatures by J. A. Donahey, the well known Cleveland *Plain Dealer* artist. The majority of the sketches are reproductions of the artist's satire on events of world and national interest, but incidentally the members of the engineering firm come in for attention.

AMERICAN STEEL AND WIRE CO. PENSION SYSTEM.

Plans for the establishment of a pension system for employes have been under consideration by officers of the American Steel & Wire Co. for nearly a year and with the opening of 1902 formal notice was posted at the various plants announcing the departure. A fund has been created by the company and will be added to from time to time and pensions will be paid from it to faithful and deserving employes who by reason of age or physical disability are retired from active service. No portion of the fund is contributed by employes, and the system has no connection with the benefit funds that have been maintained at various plants of the company.

The funds set aside for the purposes of the pension plan will be in the hands of a trust committee consisting of President Wm. P. Palmer, Wm. Edenborn and J. S. Keese. The selection of the persons to be pensioned and the general management of the pension department are in the hands of a board of administration consisting of President Palmer, P. W. Moen, J. S. Keefe, C. L. Miller and W. W. Herrick. At each mill there will be a mill committee of which the superintendent shall be chairman. This committee will investigate and report as to the eligibility of employes to a place on the pension roll. Length of service, character of the employe and fidelity to the company's interest will have much to do in determining the award. Continuity of service will be an essential.

It is but natural to expect that the liberal policy the American Steel & Wire Co. has inaugurated with the new year will do much to insure harmonious relations between officials and men, insure steadiness of operation, tend to improve the morale of the service, and by making possible the retirement of men entitled to rest in old age after years of faithful service, furnish an incentive to all employes to put forth their best effort. The following statement shows the conditions under which the pension system will operate:

All employes who have attained the age of 65 years shall be retired, and such of them as have served 10 years either with the present company or its predecessors, may be pensioned. However, an employe 65 years of age can obtain permission, through recommendation of manager, to continue for a longer period in the service of the company. Persons more than 55 years of age, who have been in the employ of the company for 10 years, may make application for retirement, and if full examination shows they are unable to continue their vocation, they may be recommended to the board of administration whose decision to pension or not shall rule. Persons not in continuous service for a period of 10 years shall not be entitled to pension.

In computing service it shall be from date a person entered the service of the company or its predecessors, and continuously remained in their employ. Leave of absence, suspension or dismissal, followed by reinstatement within six months, shall not be considered as a break in the continuity of service; persons who leave the service of the company relinquish all claims to benefits or pension allowance.

The pension allowances which the board of administration may make are upon the following basis: For each year of service an allowance of one per cent of the average regular monthly pay received for the ten years preceding retirement; thus by way of illustration; if an employe has been in the service of the company for 40 years and has received on an average for the last ten years $50 per month regular wages, his pension allowance would be 40 per cent of $50, or $20 per month.

When pension allowances are authorized pursuant to these regulations, they shall be paid monthly during the life of the beneficiary, provided, however, that the company may withhold its allowance in case of gross misconduct on his part. The disbursing officer with the approval of the board of administration, may adopt such a system of distribution of the monthly benefits as he may think proper.

Recommendations for pension allowance shall be laid before the board of administration monthly.

A pensioned employe may engage in any other enterprise differing distinctly in character and scope from his former employment and shall not thereby lose his claim to the benefits granted him.

To the end of preserving direct personal relations between the company and its retired employes and that they may continue to enjoy the benefits of the pension system, no assignment of pensions will be permitted or recognized; such being hereby declared to be non-assignable. In case any pensioned employe should assign to anyone else his claim to pension, the board of administration may stop his pension altogether.

No inexperienced person over 35 years of age, and no experienced person over 45 years of age, shall hereafter be taken into the service of the company; however, persons beyond such age limit may be taken into the employ of the company temporarily, but shall have no claim to pension; provided also, that with the approval of the board of administration persons may be employed indefinitely irrespective of age limit, if the services required are professional or otherwise special in their nature.

Neither the action of the board of administration nor the board of directors in establishing benefit or pension system, nor any other action now or hereafter taken by them, or by others in charge or connected with this pension fund in the inauguration and operation of the department, shall be construed as giving any officer, agent, or employes of the company, a right to be retired in its service, or any right or claim to any pension allowance, and the company expressly reserves the right and privilege to discharge at any time any one employed by the company when the interests of the company in its judgment may so require, without liability for any claim for pension or other allowance than salary on wages due and unpaid.

The pension department is put in charge of W. W. Herrick, of Cleveland.

CINCINNATI MACHINERY MARKET.

CINCINNATI, Jan. 6.—The new year has opened auspiciously for the machine tool trade of Cincinnati. The last month of 1901 was in most cases the best of the old year and this gave promise that the new year would be a good one. Orders have been coming in quite actively since the first of January and all of the large machine tool companies are crowded to the limit of their capacity while those that have been contemplating additions to their plants are finding it hard to get the material with which to build.

There is some trouble in getting castings due to the difficulty the foundrymen are having about iron and also in getting sufficient labor. Molders are all working and if foundrymen could have more capacity than they now have, which they very much desire, it is likely that they would have difficulty in increasing their forces so as to work it.

Domestic trade is very good, but there is no important foreign trade. Some firms report a little improvement in the foreign demand but it is far from what it was a few years ago and really cuts but a small figure in the total business. There has been some business from England and more inquiries from Germany than have been met with in some months, while France has even come into the market for some goods. It is generally believed that the most serious phase of the depression abroad has been reached as far as the worst sufferers like Germany are concerned, and as soon as the machine tool handlers get rid of their stocks that they have been unable to sell up to this time they will be in the market for goods again.

Surveyors went to work this week on the property recently purchased for the National Steel Foundry Co., at Sharon, this county, a new enterprise recently incorporated for $250,000. The two main buildings will be 500 feet long. The company expects to be able to run by the latter part of April. General Manager C. G. Robinson has been here to arrange for the work and will shortly remove from Pittsburg.

John J. Hay, for some years secretary and treasurer of the R. K. LeBlond Co., has severed his connection with that company and will become one of the principal owners in the Milwaukee Machine Tool Co. He will be succeeded in Cincinnati by F. E. LeBlond, brother of the president of the company. The R. K. LeBlond Co. is having a very large business and in common with other machine tool concerns is sold four months ahead and working hard to make deliveries.

The Cincinnati Milling Machine Co. is now working the largest force it has ever had and a good proportion of the number is on as a night force. The company reports a very satisfactory year just closed and December the largest of the last six months of the year, which would indicate that the new year would be a very good one also. This company has had a good foreign demand comparing the business received from across the water with what has been doing for the past year or two.

The Bullock Electric Mfg. Co. has been awarded a contract for 100 motors for the complete shop equipment of the new machine shop that is to be built by the Allis-Chalmers Co. at its Milwaukee branch. The award was made in spite of the fact that the Bullock Co. was not a low bidder.

CLEVELAND MACHINERY MARKET.

CLEVELAND, Jan. 6.—The opening week of the year finds local firms pushed to the extent of their individual capacities to hold the obligations to their customers well in hand and at the same time complete the inventory customary at this period. The trade in and around Cleveland may be only a parallel to the conditions elsewhere, but here it certainly has held on with remarkable strength and prospects for a continuation of the same prosperity are extremely encouraging. No more accurate barometer of business conditions is to be found than the trend of the realty market and the rapid increase in the value of residential and manufacturing establishments is in evidence as a result of the equally speedy influx of labor and capital. A glance at the transactions involving the transfer of real estate during 1901 and the prices such property demands are tokens of the growing esteem for the city for homes and remunerative employment of capital and labor. The long series of prosperous months has had some effect upon the more timorous, there being a fear that the business is, and has been, too good to last and an increase of stocks would be liable to find the holder unprepared for a decline. These sentiments are not generally shared and there is an almost universal desire to make the most of the situation; for this reason the month of December held its own and there was less of the tendency to hold up contracts until after the first of the year.

The Brightman Furnace Co., manufacturer of the Brightman mechanical stoker for steam boilers, reports business in a prosperous condition and announces the following recent sales: Metal Goods Mfg. Co., Diebolt Brewing Co., Standard Bag & Paper Co. (2d order), Cleveland Bag Factory (2d order), Perry-Payne building (2d order), Osborn building (2d order), Columbian Hardware Co., King Bridge Co. (2d order), Cleveland Wire Spring Co., Clarence building (2d order), Norcross Co. (2d order), all of Cleveland; Allis-Chalmers Co., Chicago.; Montague & Co., Chattanooga, Tenn. (3d order); Virtue Consolidated Mines, Baker City, Ore.; Standard Table Oil Cloth Co., Youngstown, O.; the Louisville Gas Co., Louisville, Ky. (4th order); Steel Tired Wheel Co., Depew, N. Y. (4th order); American Steel Hoop Co., Youngstown, O., and Allegheny, Pa., plants (2d order).

The Garrett-Cromwell Engineering Co. had a large amount of rolling mill business in 1901; in fact, the most prosperous one the firm has had, and the new year appears even more favorable than the one just closed.

W. E. Cubben has opened an office in the Permanent building and will represent the Automatic Smoke Preventer Co. of New York. Mr. Cubben is a native of Cleveland and from personal acquaintance and the growing sentiment against the smoke nuisance will no doubt find an excellent field for his line of business.

The Garry Iron & Steel Co. has secured the following recent orders: One 2,000-pound cinder crane, from the Michigan Central railroad, for their shops at Jackson, Mich.; two 20-ton car jacks for the Elgin Joliet & Eastern railroad at Joliet, Ill.; three 1,500-pound cranes for the Delaware Lackawanna & Western railroad at Scranton, Pa.; one 15-ton car jack for Armour & Co. of Chicago; one 2,000-pound crane for the Philadelphia & Erie division of the Pennsylvania railroad; one 5-ton crane, and two 2-ton pit jacks for the Cleveland, Elyria & Western railroad. The plant was closed down for a few days in the holiday week for the purpose of taking the annual inventory.

The Lane Tool Co. has an order for a 13-inch steam hammer cylinder with all attachments for the Sidney Steel Scraper Co., Sidney, O. The firm has at present in course of construction one 1,500-pound hammer for the Cleveland Hardware Co., and is much encouraged by the prospects for this line of machinery.

The Cleveland Punch & Shear Works Co. has received an order from the Utica Bridge & Machine Works, Utica, Ind., for a 20-inch throat double punch and an order from the Anaconda Copper Mining Co., Butte, Mont., for a machine of the same size. Other recent orders include one from the Vulcan Iron Works, Denver, Col., for a 72-inch gate shear; a special punch 30-inch throat, for the William B. Pollock Co., Youngstown, O., an 80-inch multiple punch for the Empire Plow Co., Cleveland; a punch with 19-inch throat for the American Steel Hoop Co. of Pittsburg and another punch of the same size for the Sharon Boiler Co. The Cleveland Punch & Shear Works Co. is working overtime two nights in the week and reports unusual activity in its line.

The Colonial Paint & Varnish Co. is speedily recovering from the effect of the recent fire which destroyed the plant. Building operations are under way on a three-story structure, 40x75 feet, and manufacturing will be resumed in all probability about Feb. 1. The accident was an unfortunate break in the course of a very prosperous season, but the firm has employed the interval to good purpose and some recently perfected improvements will enable the company to handle its business more expeditiously than ever.

E. H. Dyer & Co., builders of sugar machinery, report that business in this line has never been better and that a very heavy trade is anticipated provided no tariff changes are made affecting the duty on sugar, or that give preference to the Cuban product.

The "Long Arm" System Co., manufacturer of safety water-tight doors and hatches, has recently added a complete electrical department to the plant and expects to finish the new electrical power gear door within the next month. The firm is now at work completing the installation of its equipment on the U. S. cruisers, Cleveland, Des Moines, Chattanooga and Denver, and has contracts under way in the shop for the U. S. battleships Maine and Missouri. Official specifications call for a large number of these doors on the new ships for the United States Navy now under contract; the French Government is also preparing to install the same equipment on new vessels. The magnificent private yacht now under construction for W. B. Leeds by Tams, Lemoine & Crane of New York is to be provided with doors and hatches manufactured by the "Long Arm" System Co.

The Reliance Machine Tool Co. has increased its equipment by the purchase of a Bardons & Oliver screw machine and a Brown & Sharpe gear cutter.

The Vulcanus Forging Co. has found it necessary to purchase another riveting machine from the American Machinery Co. of Willoughby. Among the recent orders for rivets are 180 tons for a firm in California, 18 tons for a Duluth company and 100 tons for the Bassett-Presley Co. of Cleveland.

The Cleveland Machine & Mfg. Co. is a recent addition to the list of local manufacturing establishments, but has already received several contracts for 42-inch punches. The firm will also build six 24-inch automatic rod reels for the Garrett-Cromwell Engineering Co. and has just closed a contract with the American Steel & Wire Co. for a billet run.

A number of heavy tools are being added to the equipment of the Atlas Car & Mfg. Co. The increased capacity has been found necessary in consequence of the present orders as well as the business outlook. The firm has recently entered orders for equipping two tin plate mills with water boshes, trucks, cars, etc., and has on hand a contract for the complete equipment of an industrial railroad for rolling mill purposes; this latter order including ingot mold cars, charging cars, railroad plant and supplies.

The Steel Steamship Co. of Cleveland was incorporated last week at $1,000,000 by J. C. Gilchrist, F. W. Hart, A. J. Gilchrist, F. M. Osborne and W. H. Lamprecht. The offices will be at Mentor, Lake county, with a branch office at No. 404 Perry-Payne building, Cleveland. The company will operate six large steamships and will engage in the carrying business in grain, coal and ore to and from all lake ports. The boats will be 11 hatch steel steamers 400 feet over all, 50 feet beam and 5,800 ton capacity each. Two of them, the F. M. Osborne and the F. W. Hart, have already been launched, and a third, the E. N. Saunders, will be launched within two or three weeks. The three others will be afloat before May 1, 1902.

The Duluth, Missabe & Northern road, which hauled 3,437,955 tons of iron ore the past season has sold 20 heavy locomotives and will have larger ones built to take their place. The new ones will be of the heaviest and strongest type. In preparation for these locomotives and for the steel cars it proposes to use hereafter, the road is replacing its wood bridges by steel, is straightening its lines and otherwise making improvements.

A NEW RADIAL DRILL.

It is probably fair to say that the radial drill has developed less during the past 15 years than any other standard machine tool. It would seem that other tools, particularly the several types of lathes, have so engrossed the attention of designers that the radial drill has been more or less neglected and the possibilities of its development rather lost sight of. The Bickford Drill & Tool Co. of Cincinnati, has just placed upon the market the new radial drill that is illustrated herewith. This machine possesses several novel features, and gives evidence of a bold effort to introduce means of augmenting output, while at the same time increasing accuracy.

The machine is provided with a wide range of speeds and feeds operated through nests of gears that give any speed and feed without stopping the spindle; a depth gauge for reading all depths from zero; a multiple automatic trip that can be set to operate at as many different depths as there are holes to be drilled; a safety stop, and a tapping device that operates at all speeds. The power is applied to a single driving pulley and is transmitted through a speed box mounted on the base at the left of the column. The single lever shown gives any one of four speeds instantly, without stopping any part of the machine, by operating the friction clutches shown in the sectional view, Fig. 2. This speed box takes the place of the customary cone pulley. The advantages claimed for it are that it does away with all belt shifting, prolongs the life of the belt, gives great economy of power—the belt speed being constant and the pull, therefore, directly proportional to the power absorbed at the drill; can be driven with unimpaired convenience from below the floor, when the arm is free to describe a full circle about the column; permits setting the machine at right angles to the line shafting by using a quarter twist belt, and is equally efficient when driven electrically because it permits the direct connection of a constant speed motor.

The second shaft of the speed box transmits through mitres to the back gears. These are mounted in a box bolted to the back of the cuff, or sleeve, of the arm, and are operated through friction clutches, without stopping any part of the machine, by the pair of levers shown at the extreme left of the arm. An engraved index plate on the cuff tells the operator how to manipulate these levers. The speed box and back gears together give 16 spindle speeds, which are arranged in geometrical progression from 16 to 256 revolutions per minute. The back gear shaft transmits to the head and through a train of gears to the drill spindle. The feed box is mounted on the head immediately to the left of the drill spindle and contains a nest of gears that give instantly any one of 8 feeds, ranging in geometrical progression from .005 inch to .1 inch per revolution of spindle.

The method of feed changing is shown in Fig. 3. The sliding key A is hinged to the pull pin B; there are three keyways in each gear and between each pair of adjacent gears there is a steel ring so shaped that the key is free to be moved at any instant to any one of the four gears and then engages automatically with the first of the three keyways that comes around. The position of lever C, a quarter turn of which changes the feed either to the next higher or the next lower, indicates which of the gears is operating. The cone of gears shown gives 4 of the 8 feeds; the other four are obtained by means of a similar pull pin key actuating two gears immediately below. Taken together, the feed changing, speed box, and back gear levers give practically instantaneous speed and feed changes. The engraved plate on the front of the feed box gives positions of levers for the eight feeds. The range of these feeds is indicated in Fig. 4. The specimen shown was prepared without stopping the spindle—each half inch of traverse being read direct on the dial depth gauge—and with only sufficient interruption of the feed to give a clear line of demarkation between changes.

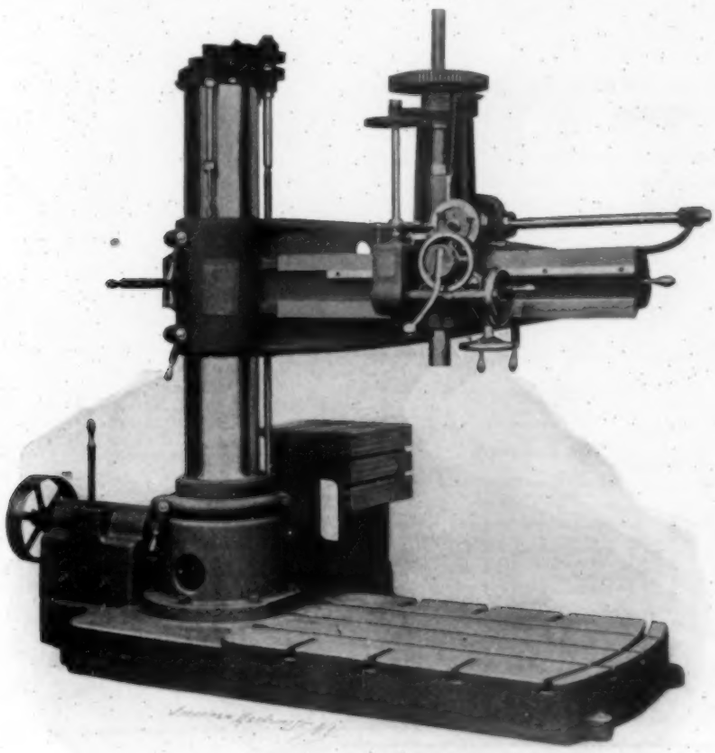


FIG. 1.—THE BICKFORD RADIAL DRILL.

Another feature of the machine is the zero depth gauge and multiple automatic trip. Fig. 5, in the lower view, shows this trip and gauge set for drilling three holes, the respective depths of which are 3, 6½ and 8¾ inches. To set, the graduated dial is turned until its stop pin brings its zero opposite the fixed pointer; the dogs are then set by the graduations on the dial for the depths required. An important feature of this tripping mechanism is that while drilling the 8¾-inch hole, for which the third dog is set, the other dogs can be rendered inoperative by simply lifting a latch on the clutch pawl; or if by any chance the workman neglects to lift the latch and so permits an intermediate dog to trip, the feed can be continued without interruption by

throwing the clutch in again by hand. The upper view of Fig. 5 shows the first dog at the moment of tripping.

The safety stop, S, Fig. 5, is a steel pin permanently secured in the face of the tripping gear. When the spindle reaches the end of its traverse this pin engages positively with the fixed part of the clutch pawl and makes it impossible for the feed to be continued or the clutch thrown in again until the spindle has been raised. In the general design of the machine great rigidity has been aimed at by making the arm as well as the column in pipe section so as to overcome both the twisting and the bending stresses, while to take care of exceptionally severe conditions the base has been provided with a circular arc slot from which the end of the arm can be supported. The hand wheel for operating the head is on the head itself immediately in front of the tapping lever.

The machine is being built in four styles, in which modifications of some of the above features are introduced, and in three sizes, to drill to the centers of 8 feet, 10 feet and 12 feet circles, respectively. The illustration shows the smallest size. This has a total vertical feed of 15 inches and will, the makers assure us, pull a 4-inch twist drill through solid cast iron under a feed of .012 inches per revolution.

AMERICAN METHODS AS VIEWED BY BRITISH ENGINEERS.

The discussion of American industrial methods still goes on in British engineering circles. The pilgrimages of British engineers to this side in 1901 are already yielding their crop of after-dinner speeches, and we doubt not the more studied and elaborate treatment of technical society papers will follow. From our English contemporaries we glean some significant and highly interesting, if not in all cases accurate statements embodying the impressions of men who have only recently returned from tours of the manufacturing centers of the United States. At a dinner given Charles Dorman, of Dorman, Long & Co., Middlesbrough, Eng., Dec. 14, on his return from the United States, Mr. Dornan spoke at some length detailing what he had seen in the mills of the United States. His company is an extensive manufacturer of bars, structural steel, bridge work, sheets, rods and wire. His trip to the United States was made in company with T. G. Wrightson. A synopsis of his remarks at the dinner in question is as follows:

He said the rolling mills in America were on the whole a good deal superior to the rolling mills in England. What struck one about the mills in America was that they were kept constantly in motion. From the time that an ingot was taken out of the soaking pit it was never allowed to rest. The whole bar was in motion from beginning to end. There was, however, no reason why, if they infused a spirit of energy into all their operations, they should not do just as well in their mills as the Americans. At the present time the Americans could perhaps do bridge building work cheaper than English makers, but in their own bridge building works they had as good plant as any that he saw in America, and when they had got a few more tools he really believed that they would do excellently well. Their own steel works were second to none. In England people were too fond of making machinery fit for exhibition in the Academy or the Paris Exhibition. It was good, but unnecessary money was spent upon it. The Britisher wanted to make a machine that would last 150 years, and that he could hand down to his grandson. The American was satisfied if his machine lasted ten years, and he was willing to break it up at the expiration of that time, believing that something better was likely to be invented. In Chicago he saw a wire rod mill capable of turning out 2,300 tons per week. At their own works a mill turned out 400 tons a week when it was at its best. At Boston he saw two wire rods rolled at the same time, whereas it took them all their time to look after one rod. These were the only advantages America had in wire rolling so far as he could see.

In America the working man was more intelligent than the working man here. The conditions in America were different. In England a man was brought up by his parents, and when he was released by his parents he joined a union and relied on that. He said nothing against unions, but what he wished to point out was that in America a man worked more or less on his own, and as a rule did very well for himself. Intelligent men at once came to the front, carned bigger wages, and got to the top of their trade. The American workman, in the evening, instead of going to the public house as they were liable to do in England, went to some institute where he could smoke, and, he dared say, get something to drink, and could listen to a lecture which concerned the work in which he was engaged every day. He attached great importance to that. The clerks, draughtsmen, and foremen in England were every bit as capable and intelligent as the Americans. With regard to the masters, he ventured to say that in England the masters were not very full of brilliancy. What they wanted in England was co-operation between workmen and managers. At present the workman seemed to think that whenever the employer was going to put down new machinery he was going to rob him, and the employer thought it was useless to put down new machinery, because the workman got all the advantage. When the day of co-operating came he felt confident that they would not only be able to repel the American invader but to keep the countries to which they sent their goods and to add to their markets.

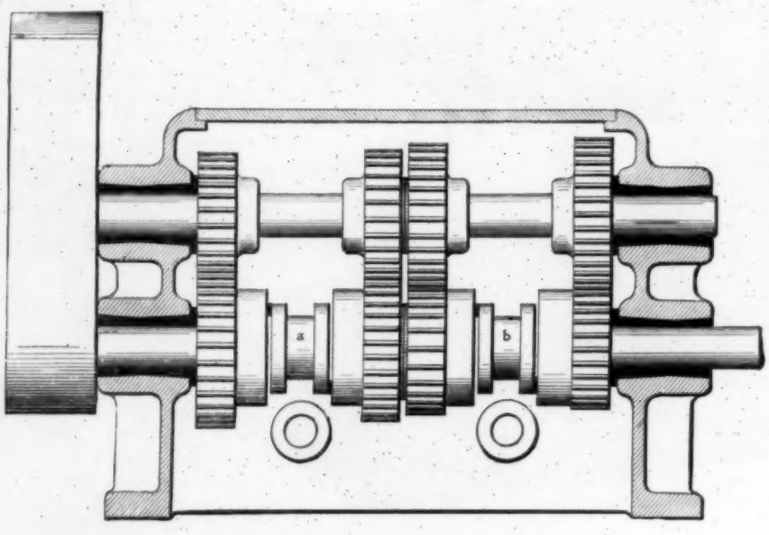


FIG. 2—SECTIONAL VIEW OF THE SPEED BOX

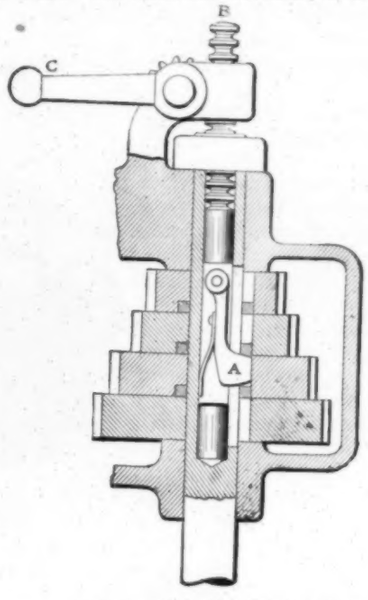


FIG. 3.—FEED-CHANGING DEVICE.

Views of Leeds Engineers.

The annual dinner of officers and foremen of the Steam Plow Works of John Fowler & Co., of Leeds, on Dec. 14,

was turned also into a study of American methods. R. H. Fowler dwelt on some of his experiences in the United States. He said that an English engineer with whom he was speaking the other day said that the principal thing which struck him in America was the great amount of work which each man in a shop did. The men worked at high pressure, and with labor-saving tools and appliances the quantity of work which they turned out was marvelous. "One of the great difficulties against which we have to contend in this country is," added Mr. Fowler, "that an Englishman thinks there is something else besides work. When a man in America is working he does not think of enjoyment at all. He works from seven till six—ten hours a day—and overtime, and in many towns there are few facilities for amusement in the evening. As far as I can make out he has only two holidays in the year—Independence Day and Christmas Day. Another fact is that every workman considers it his duty to use the labor-saving machinery to the fullest extent. There is no doubt that if we are going to hold our own, we shall have to put our house in order." Mr. Fowler thinks that the western coast of America, owing to its wealth of mineral oil, will become as great a manufacturing district as the eastern coast. In Chicago he came across a foundry on the sixth floor of a building, and one establishment which he visited turned out 1,000 plows a day. In five months he and Mr. Turner traveled 25,000 miles, and they trusted they had done a little, in spite of heavy duties, to establish their connection in America. They sold sets of plowing tackle, and they hoped other orders would follow. It was not his desire to reduce men's wages, but something might be done in England in the way of cheapening the process of production.

Alderman Wigram, in responding to "Our Representatives," said that Mr. Westinghouse seemed to have a good opinion of British workmen if properly handled. He declared that he had built the new works at Manchester cheaper than he would have been able to do in America.

Proposing "Our Engineering Staff," Mr. G. Turner said he had frequently been told on the Continent that English engineers made machinery without much technical knowledge, but that view would not be accepted by them. His tour through America was very interesting and instructive, though in one sense disappointing. He had expected to find a superior class of men, but he never met with any body of engineers whom he would like to exchange for theirs. The best men he came across were Englishmen. Mischief was sometimes done by snubbing men. In this connection Mr. Turner mentioned the case of a molder in the Midlands who was rebuked for making a suggestion about a pattern, and who consequently emigrated. The man now filled a most important position in America. "Bad workmen will put up with snubbing, but good men won't. If a good workman comes to you with a suggestion or opinion, listen to him. In America men are encouraged, and in that way the American shops are better than ours. Then in this country not only the men, but the officials and masters are occupying themselves too much with football. We do not sufficiently stick to work, and that is one of the reasons we are losing our trade." In conclusion, Mr. Turner said he was a bit afraid of America, but not of Americans.

The United States England's Real Competitor.

Responding to the toast "The Trade and Port of Goole" at the annual dinner of the Goole Chamber of Commerce Dec. 16, Mr. Rupert Beckett said that the present commercial cloud was due to the war and the great competition of Germans and America. There was not much to apprehend from Germany, because their competition was not on a sound commercial basis, and had produced the inevitable crisis. The United States were England's real competitors. Their commercial methods were better. He did not advocate vast combinations, but thought manufacturers could imitate American standardization of work with advantage.

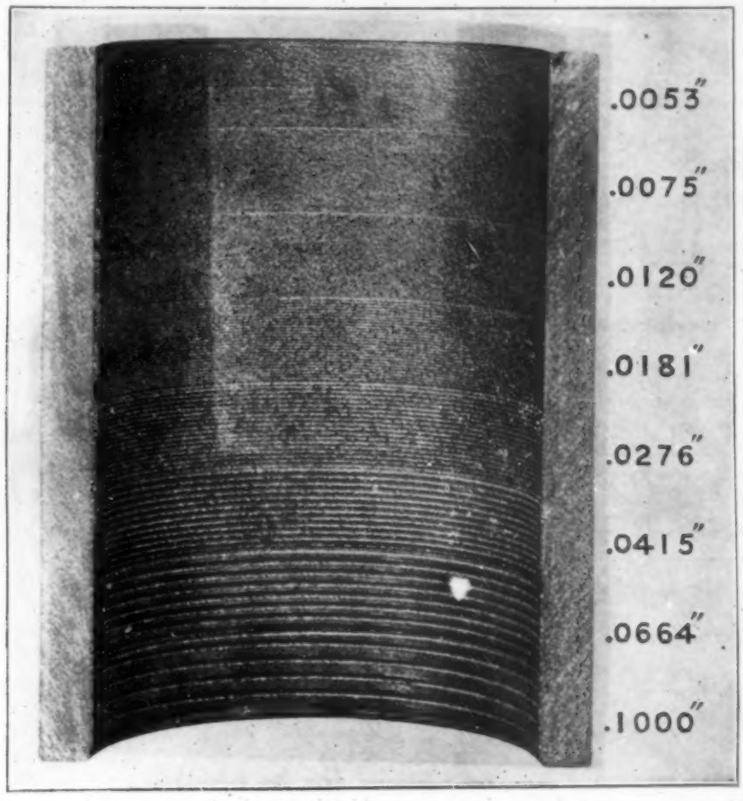


FIG. 4.—SPECIMEN OF THE FEED RANGE.

One of the most gratifying developments of the past few weeks is the decision of a number of railroads to increase the wages of their employes. The Pennsylvania Railroad Co. announced to its train and yard men on Monday, Jan. 6, that with few exceptions their wages had been adjusted to date from Jan. 1. This means an increase in most instances and will require the payment of several hundred thousand dollars a month more than is now paid on the scale. The Pennsylvania Railroad Co. has about 97,000 men in its employ on its lines east of Pittsburg and Erie. Only the adjusting of the wages of the train crews and yard men were taken up, and it is said the change will affect at least 30,000 men.

FURNACE PRACTICE WITH FINE ORES.

To the Editor:

The time has come when manufacturers of pig iron are brought face to face with a serious problem. The question is, must the large-capacity blast furnace, capable of turning out between 600 and 700 tons of iron a day, be abandoned? Already experience has partly answered the question and the large manufacturers are awaiting still further experience along lines already started before they reached final decision. The cause of this problem is found in Mesabi ores. Already the supply of lump ore for use in the blast furnace is utterly inadequate and is rapidly growing smaller. More than this the Mesabi ores are much cheaper to land at the docks; they are rich in iron, easily smelted, and contain but little phosphorus and sulphur. They are lacking in only one respect and that is their physical condition. The exceeding fineness of these ores has given rise to the serious problem that now confronts blast furnace managers and owners.

Within the last score of years there has been two doublings in blast furnace capacity. Eighteen or 20 years ago a furnace that could turn out 150 tons of iron a day was a marvel of mechanical and scientifis success. Then came the furnace of 300 to 350 tons of iron a day and manufacturers believed that the practical limit had been reached. It is not altogether certain at the present time that they were not right. With lump ore the present monster 600-ton furnaces would unquestionably be a success. It is much less expensive to operate one of these furnaces than to operate two 300-ton furnaces. The cost of construction is less, the cost of labor in operating the furnace is less, and less power is required. But lump ore is hard to find and it is absolutely essential, in order to manufacture iron successfully, to use the fine Mesabi ores. In the 600-ton furnaces using a high percentage of Mesabi ores, it is estimated that the loss in fine ores is from 40 to 50 tons a day in flue dust. Taking the lower figure with Mesabi ore at $3.50 a ton this is a daily loss of over $125.

Another drawback to the use of large quantities of fine ores in the furnaces causing perhaps a greater money loss in the end and, what is infinitely worse, jeopardizing the lives of the employes and the structure of the furnace and surrounding buildings, is the explosions which may occur at any time and in some cases are an every day affair. The weight and exceeding fineness of the Mesabi ores when used in large quantities in a furnace are sure to cause clogging. The ore becomes packed together so closely that there is no opportunity for the gases to work their way through the mass. In consequence, gas pockets are formed, which explode with such force at times as to result in a large loss of both life and property. Sometimes where the gas pockets are formed near the top of the furnace, the weight on top is small enough to permit relief by the blowing out of the top of the furnace of a few tons of ore. At other times, where the trouble is more deep-seated and the oppressing weight much greater, the result is a partial demolition of the furnace, perhaps loss of life, and the endangering if not the destruction of surrounding buildings.

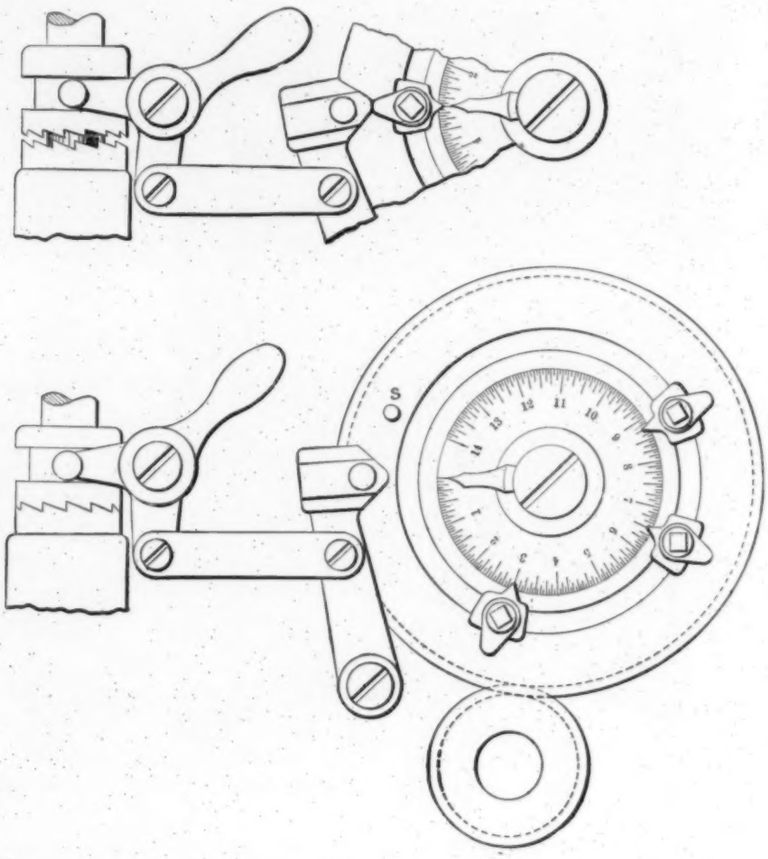


FIG. 5.—ZERO DEPTH GAUGE AND MULTIPLE AUTOMATIC TRIP.

There are two visible means of overcoming these conditions. One is to abandon the present large capacity furnace and use two smaller ones to accomplish the same results. Even in this case there would be a loss of about 8 per cent of ore escaping as flue dust, and it is not altogether certain that the explosion element would be entirely eliminated. In addition there is the much larger expense. The other remedy is to put the fine ore into solid block form before it enters the furnace. And herein lies the one factor of progress to be determined. The Henry S. Mould Co. already has a machine that can put the fine Mesabi ores into solid block form. These briquettes have been submitted to intense heat and it has been demonstrated that there is no tendency toward decrepitation before the ore begins to smelt and the iron to run off. The only experiment still untried is whether the great weight in the furnace will cause a crumbling of the briquettes. While this has never been demonstrated up to the present time, there is little doubt that the briquettes will stand the test.

Smelters all over the world are using the machinery to great advantage and, while the weight is not so great, the process is largely the same.

The cost of briquetting is very low and, if it can be brought to a thorough and successful demonstration, the large blast furnace will stay and there is every reason to believe that even larger ones than those in use now will be made possible. If the trial proves a failure the 600-ton blast furnace will have to be relegated to the junk heap or run on half capacity, or else torn down and two small ones built to take its place.

Several of the largest iron manufacturers in the country have already decided to try the briquetting process and it will be but a short time before adequate tests will be available.

HENRY S. MOULD CO.

Pittsburg, Pa.

TRADE PUBLICATIONS.

Catalogue 27 of the Link-Belt Machinery Co., Chicago, is a pamphlet descriptive of the Ewart link belting, said to be the first detachable chain made. The work of the company is not limited to this type of chain, and in the 20 years of practical installation and operation of link-belt machinery the firm has designed a large number and variety of chains for special purposes. The present publication contains a useful table, giving the approximate horsepower transmitted by the different sizes of chain at 100 to 1,000 feet per minute under average conditions. Many full-page illustrations show the relative proportions of the links, etc.

The McCormick Harvesting Machine Co., Chicago, has sent out a notable catalogue. It is profusely illustrated in colors with striking designs on the cover, and the character of the advertising is likely to hold the reader's attention if he has any interest at all in that class of machinery. The writer of the work has evidently placed himself in touch with both buyer and salesman, and a goodly share of the space is taken up by a dialogue between keen representatives of the two classes in which the merits of McCormick machinery are thoroughly exploited.

The Green Engineering Co., Chicago, has reprinted an account of some recent improvements at the Western avenue plant of the Chicago Union Traction Co. These improvements comprise the equipment of the entire plant, 8,000-h. p., with the Green traveling link grates, together with an interesting method of handling the ashes designed by John Z. Murphy, chief engineer of the Traction Co. This reprint is being sent out with a catalogue which goes very freely into the matter of progressive combustion—how it can be secured, why it is necessary, and what efforts have been made to obtain it. The story and argument are told pointedly and the whole is a thought provoking addition to the literature of the coal pile.

The Standard Pneumatic Tool Co., Chicago, has issued a translation in French of the booklet treating of "Little Giant" pneumatic tools. The pamphlet is well supplied with illustrations and contains, among other useful material, a reprint of the paper read by Ewart C. Amos at the meeting of the Institute of Mechanical Engineers, London, 1900.

The Brighton gas and gasoline engines are treated with some detail in an elaborately illustrated catalogue sent out by the Pierce-Crouch Engine Co., New Brighton, Pa. The publication is an excellent specimen of typography, even in these days of advancement in that art. The engines are built vertical or horizontal; the latter following the well known straight line principle of construction with auxiliary piston valve, self-oiling phosphor bronze bearings and an automatic starter. The vertical engines are built in three sizes from 1 to 3½-h. p. The horizontal engines are constructed up to 75-h. p.

The catalogue of the Keystone Driller Co., Beaver Falls, Pa., is a much more comprehensive production than the great majority of that class of publications. It covers some 86 pages, about 11x9 inches, and goes thoroughly into the discussion of drilling machinery for making artesian wells, test wells for gold, silver, zinc, lead, coal, etc., testing for bridge piers, air holes for mines, etc. The catalogue also contains a general treatment of the art and science of drilling, with instructions for setting up, operating, dressing bits, etc. The information is presented in a practical manner, and forms a useful compendium of drilling data; while in combination with the cuts and description of this particular line of equipment it cannot fail to prove an excellent promoter of sales. The present work has reached a tenth edition. In addition the firm has special catalogues referring to prospecting machinery and heavy oil and gas well machinery.

The Washington Coal & Coke Co., whose general offices are at Dawson, Pa., and sales offices at Pittsburg, has published a noteworthy commercial reminder for 1902—a flat book, bound in morocco, 7x10¼ inches. There are two days to a page in the memorandum portion of the book, which is preceded by valuable census, political, postal and fiscal statistics and other information. Several full-page half-tone views are given including illustrations of the company's No. 2 plant, its modern coke crusher and the loading of Washington coal into vessels at lake port, by the use of car handling machines. The daily capacity of the company's properties is 5,000 tons of Youghiogheny coal. M. M. Cochran is president of the company, W. Harry Brown, vice-president; J. S. Newmyer, general manager, and John H. Wurtz, secretary and treasurer. The sales offices at Pittsburg are in charge of N. P. Hyndman, assisted by H. R. Hyndman.

The sixth edition of catalogue No. 2, issued by the Allis-Chalmers from the Fraser & Chalmers works at Chicago, presents in a pamphlet of 127 pages, 6x9 inches, information regarding hoisting in general and the various types and forms of hoisting engines manufactured by this company. There are many excellent half tones together with a number of useful tables, formulæ and diagrams for ascertaining the proper working loads on steel hoisting ropes, computing effective weight of loads, etc.

Iron in the Sixteenth Century.

The cost of the railings around St. Paul's cathedral (claimed by several Sussex parishes, but really made at Lamberhurst, a parish partly in Kent) is recorded in the account books of the manufactory as having been £11,202. The total weight was 200 tons. The amount of employment given may be conjectured from the statement of Richard Woodman, one of the Marian martyrs burned at Lewes in 1557, that he nad set a hundred persons to work for the year together.—[London Spectator.

The furnace of the Struthers Furnace Co., Struthers, O., continues out of blast, owing to the inability of the company to secure coke to operate. The stack has been in shape to put into blast for several weeks.

Owing to the scarcity of billets and tin bars, the Ohio plant of the National Steel Co., at Youngstown, O., will not operate on rails until March 1. Several months ago it was announced that the plant would operate on rails after the first of the year.

The Pacific Steel Co., Irondale, Wash., put the charcoal furnace into blast Dec. 14. The stack is 51 feet high, 10 feet 4 inches bosh, and has a daily capacity of 50 tons. The ore is brought from the Texada Island mines, off the coast of British Columbia.

The Detroit Graphite Mfg. Co., Detroit, Mich., has appointed C. L. Robinson, to act as assistant to T. R. Wyles, Western manager of the firm, whose office is at 1425 Monadnock Block, Chicago.

Crane Co., Chicago, distributed to its employes, Dec. 31, 1901, $125,000, with the desire of giving its workers some share, over and above their wages, in the prosperity which it has enjoyed in the year just closed. Every person in the employ of the company, 3,500 men and women in all, received a sum equivalent to 5 per cent of the money each earned in 1901. No limit was put on length of service; men only a month at work got 5 per cent of that month's wages.

The Cambria Steel Co., Johnstown, Pa., is rebuilding blast furnace No. 5. It will be equipped with an automatic skip and other improvements.

A NEW METHOD OF FASTENING ARMS, LEVERS OR PULLEYS TO SHAFTS.

Considerable trouble has been experienced in devising a suitable means of securing the so-called "steam-arm," the arm or lever which is fastened to the stem driving the steam- or inlet-valve on a Corliss engine. The same difficulty exists with other connections of oscillating or rotating machine parts; particularly if the motion is at all jerky or the parts have any great amount of power to transmit alternately in opposite directions. In order to meet this difficulty, Carl J. Printz, designer of pumping engines, with the Allis-Chalmers Co., at Milwaukee, Wis., has patented an improvement which is illustrated in this article. Fig. 1 is a sectional side

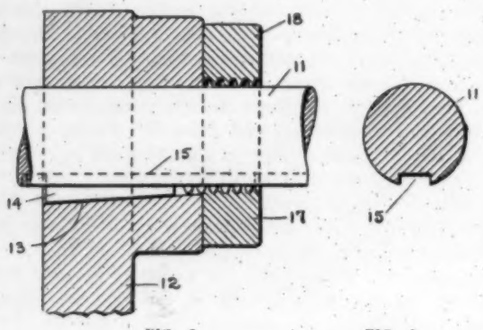


FIG. 1. FIG 2.

SECTIONAL VIEWS OF THE PRINTZ CONNECTION AND SHAFT

view through the center of an arm or pulley, secured to a shaft by means of this device; Fig. 2 is a cross section of the shaft, and Fig. 3 is the key. The several parts have the same reference letters to denote identical portions of the device in the different views. The bore of the hub which is to be attached to a shaft, is slotted with a wedge-shaped key-seat 13, which receives the tapered or inclined face of a key 14. The opposite face of the key is preferably fitted into a recess splined into the shaft or stem 11, and one end of the key projects beyond the end of the hub and has a series of

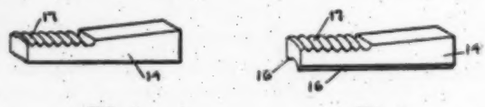


FIG. 3. FIG 4.

THREADED KEYS FOR SPLINED AND PLAIN SHAFTS.

teeth on the outer face of the extension as at 17 in Fig. 3. A nut 18 surrounds the shaft and is tapped out to fit the threaded end of the key and when the nut is turned in the proper direction the key is drawn into tight wedging engagement with the key-seat 13 and the straight spline in the shaft 11.

It is, of course quite apparent that the device may be modified to a considerable extent. For example, the depth of the key may be increased by the use of a sleeve forming part of the hub and extending a distance equal to the thickness

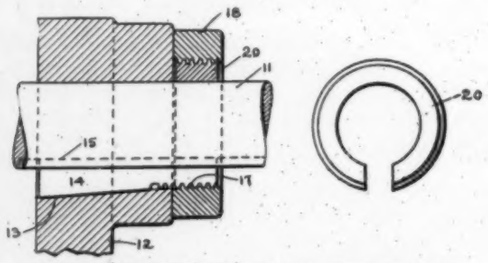


FIG. 5.—MODIFIED FORM OF THE NEW DEVICE.

of the nut, the latter being bored out to fit over the extended hub, thus the thickness of the key can be increased an equal amount to that of the sleeve, and the arrangement is thereby a much stronger connection. Another modification may be made by having the sleeve in the form of a short bushing separate from the main hub. This short sleeve is threaded to fit the nut and has an opening cut through the rim for the passage of the end of the key. The threaded sleeve is illustrated in Fig. 5 at 20, the nut being shown at 18. If the sleeve 20 formed a part of the main casting 12, and the threads were turned off so that the nut 18 could be easily slipped over it, then the previously mentioned arrangement would be shown. Either of these latter plans permit the use of a deep key, and there is less need of splining the shaft for the use of a key like the one shown at Fig. 3, providing there is an objection to cutting the spline in the shaft; in such cases the key in Fig. 4 may be adopted, this key having the straight face with projecting knife-edges 16, which engage the surface of the shaft.

CHCAGO PNEUMATIC TOOL CO. OF NEW JERSEY.

The organization of the Chicago Pneumatic Tool Co. of New Jersey has been completed, and on Dec. 31, it took over the properties proposed, namely, the business and plants of the Chicago Pneumatic Tool Co. of Illinois; the Boyer Machine Co., Detroit, Mich.; the Chisholm & Moore Mfg. Co.'s crane department, Cleveland; the Franklin Air Compressor Co. of Franklin, Pa., and the new Taite-Howard Pneumatic Tool Co., Ltd., of London, Eng. The securities issued are $2,000,000 5 per cent 20 year gold bonds, and $5,000,000 common stock, there being only one kind of stock. There remains in the treasury unissued $500,000 of bonds and $2,500,000 of stock. The company starts with a working capital largely in excess of a million dollars, of which more than 50 per cent is in actual cash. It also starts with actual earnings by the constituent companies before this organization, at the rate of $700,000 per year, which, after paying fixed charges and sinking fund under the mortgage, leaves 11 per cent earnings on the stock. J. W. Duntley, the president of the company, is of the opinion that these earnings will be very largely increased as the result of the unification of these properties under one company, and that one great need is supplied, namely, getting sufficient capacity to care for the trade and take advantage of the increased business which is constantly offering.

The directors of the company are as follows: Charles M. Schwab, president of the United States Steel Corporation; John A. Lynch, president National Bank of Republic, Chicago; John R. McGinley, capitalist and banker, Pittsburg; James H. Eckels, president Commercial National Bank, Chicago; William B. Dickson, assistant to the president of the United States Steel Corporation; Charles A. Miller, president of the Galena Oil Co.; J. W. Duntley, president of the Chicago Pneumatic Tool Co.; Joseph Boyer, president of the Boyer Machine Co., Detroit, Mich.; Edward Y. Moore, vice-president of the Chisholm & Moore Mfg. Co.; Max Pam, counsel; John Charles Taite of the Taite-Howard Co., London, Eng.; Charles Parker Whitcombe, of the Taite-Howard Co. The executive committee is composed of J. W. Duntley, chairman; Charles M. Schwab and Max Pam. The officers are: J. W. Duntley, president; W. O. Duntley, vice-president; Edward Y. Moore, second vice-president; Ernest P. Wenger, treasurer; H. R. Kent, assistant treasurer; Leroy Beardsley, secretary; S. G. Allen, assistant secretary; Joseph Boyer, mechanical engineer; A. J. Doughty, general superintendent; Pam, Calhoun & Glennon, general counsel.

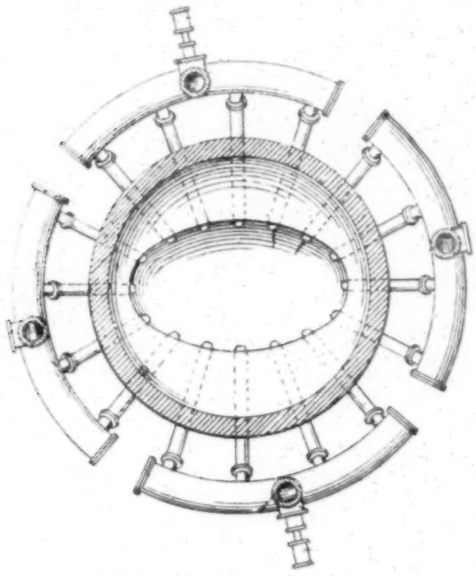
F. C. Dugan and J. W. Haxell have been appointed receivers of the foundry operated by Diven Bros. & Co. at Baltimore, Md. Their bond was fixed at $50,000. Receivership proceedings were commenced by one of the partners, who alleges that the foundry is being operated at a loss, and makes further charges of irreconcilable differences among the members of the firm.

The new plant of the W. B. Pollock Co., Youngstown, O., was placed in operation this week. The location of the plant is admirable so far as railroad facilities are concerned. The new plant is very complete throughout, facilities for doing structural and boiler work being the best.

The Empire Steel & Iron Co. (principal office, Catasauqua, Pa.) will put the Gem furnace, Shenandoah, Va., in blast. The furnace was blown out about a year ago.

A BLAST FURNACE WITH OVAL HEARTH.

A patent has been recently granted to Samuel W. Vaughen of Lorain, O., for an invention in blast furnace construction. As is well known the present forms of blast furnaces for the reduction of iron ores have a circular horizontal section, and in order to obtain the capacities required by modern practice the diameters become so large that their operation is irregular and is not capable of such easy regulation as the old furnaces of smaller dimensions. The inventor says that it is generally conceded that the size and production of a furnace is limited, not on account of the inability to reduce the ores rapidly, but by reason of the fact that the large-sized modern furnaces are unable to smelt the material as quickly as it could be reduced if the process was conducted with regularity. For example, in the case of a small furnace producing a large tonnage, the stock passes through the furnace and is converted from the raw material into pig iron, with the consequent formation of slag, etc., in about nine hours, and sometimes less. But this rate of driving cannot be attained in the large furnaces, for the reason that to obtain the same proportionate size of hearth area in the large furnace as in the smaller one the hearth diameter becomes very great, and in order that the blast may have the necessary penetration it must be forced into the hearth at a much greater pressure



A BLAST FURNACE WITH OVAL HEARTH.

than is practicable with present apparatus. In operating with hearths of large diameters when one part becomes clogged the free or open part gives passage to all the air, smelting and reducing the material more rapidly in the open part of the furnace. This reduces the effective area in which the operation proceeds so that a portion only of the large furnace becomes useful and its capacity for production is correspondingly decreased.

The invention now under consideration provides a blast furnace with an oval hearth and a bosh which is at its lower part of the same form as the hearth and tapers up to join the cylindrical stack. The blast pipes are so arranged that the air can be directed into any quarter of the hearth which needs to be cleaned from obstructions. In addition to the usual bustle pipe encircling the furnace bosh, a lower bustle pipe is provided. This is made in four sections, each connected with the main bustle pipe by a nipple and a stop valve.

The engraving shows a horizontal sectional view taken directly underneath the main bustle pipe. It shows the oval or elliptical hearth, and the outline of the stack; pipes connecting the main bustle pipe to the auxiliary pipes, and a gate or valve in the pipe connecting the main bustle pipe to the auxiliaries. The stop valve has a small opening in the center so that when the valve is seated there still remains a small opening for the blast, sufficient to keep the slag, etc., out of the tuyeres. There is a fluid-pressure cylinder for operating the stop valve and the auxiliary pipes are equipped with blow-pipes connecting with a similar number of tuyeres.

Mr. Vaughen is also the patentee of a blast furnace top. He proposes such an arrangement that a furnace provided with it may be charged without the necessity of the employment of workmen or top-fillers to dump the stock into the upper receptacle. It is also an object of the invention to provide a top-filling apparatus, which is firmly secured to the shell or body of the furnace in such a way that it will not become disarranged by the dust or gas explosions which occur in smelting certain ores, and in order to give sufficient vent to the gases occasioned by such explosions a large number of safety-valves or explosion-doors are provided through which the excess of pressure may be discharged, leaving the charging apparatus intact and ready for operation. The device is so constructed that a charge is dropped into the furnace-top at a number of points, thus providing for the uniform distribution of the charge throughout the cross-sectional area of the blast furnace. In addition to this the apparatus is so arranged that as the top is opened for the introduction of the charge the gases are not permitted to escape, but are retained by an upper closure forming a gas seal, and by this means practically all the combustible gases are preserved for use in heating the hot-blast stoves or boilers and the upper apparatus of the furnace is preserved from destructive contact with the flames which are ordinarily occasioned when the gases are permitted to escape into the air at the time of dropping a charge.

The Iron Ores of Bilbao.

The iron ores of Bilbao, Spain, are of five classes, all low in phosphorus, and are designated locally as follows:

1. Vena.—Red hematite; compact, soft or sometimes powdery, generally the purest of the ores holding about 64 per cent of iron. It was the only ore used in former times to supply the Catalan forges. Very little of it now remains.

2. Campanil.—Red hematite; compact and crystalline, with numerous little drusy cavities lined with calcite. It is the best of the ores, with the exception of Vena, and is one of the chief ores in the Triano Mines. It strongly resembles the hematites of Whitehaven and Furness. It may be said to carry about 55 to 58 per cent of iron with 4 to 8 per cent of lime.

3. Rubio.—Limonite, carrying about 55 per cent of iron, but usually more or less siliceous.

4. Chirta.—A ferruginous clay, with limonite nodules scattered thickly through it.

5. Carbonato.—Siderite, carrying about 44 per cent of iron. Found almost exclusively at or near the base of the hematite or limonite deposits, and can be seen to pass into them.

A contract has been awarded by President Hall of the New York, New Haven and Hartford Railroad Co. for the roller lift bridge which is to replace the swing bridge now spanning the river at Bridgeport. The successful bidder is the Pennsylvania Steel Co. of Steelton, Pa. The new bridge will have four tracks and is designed to carry a load of 10,000 pounds per lineal foot, in addition to a concentrated load of about 100,000 pounds at any point on the floor of the structure.

On Jan. 1, 1902, the Bullock Electric Mfg. Co. of Cincinnati and the Wagner Electric Mfg. Co. of St. Louis established a foreign sales department with headquarters at Cincinnati. Hereafter all foreign business, except in Mexico and Canada, for the two companies will be handled by this new department, which will be under the management of Frank G. Bolles. The work of the advance department will continue under the direction of Mr. Bolles, under whose charge it has been for the past three years.

M. G. Loder, formerly in the purchasing department of the Deering Harvester Co., Chicago, has been appointed Cleveland representative of the Carborundum Co., of Niagara Falls, N. Y., manufacturer of grinding wheels, with offices at No. 3 South Water St. Mr. Loder will have charge of all sales in the Northern Ohio counties of Cuyahoga, Summit, Stark, Wayne, Medina and Lorain.

METHODS OF CAST IRON PIPE MANUFACTURE.

Three papers were considered by the British Association of Waterworks Engineers at its meeting in London on Dec. 7, on methods of manufacturing cast iron pipe. The first by A. G. Cloake on French practice, was read at a previous meeting. The second, on British practice, was by S. H. Terry. In the third, the secretary of the association presented a digest of a number of articles dealing with practice in the United States.

Mr. Terry, in describing the methods of British pipe founders, said that in the early days of pipe founding, when charcoal was used as fuel, difficulties arising from badly cast pipes were not frequent. The molten iron, being free from impurities, flowed freely, and the absence of keen competition in the trade or of rigid specifications had not induced the practice of casting pipes too thin, and thus creating one of the most fruitful sources of trouble. In pipe founding the saving of metal and weight, in order to reduce the freight charges, may lead to increase in the number of wasters during manufacture, due to scab, blowholes, cold shuts, shifting of cores, breaking-in of runners or trimming, all of which losses have ultimately to be borne by the buyer. Thin pipes cost more per ton to mold and cast than those of proper size, and are more liable to fracture in transport and jointing, so that a greater proportion of extra pipes has to be provided per mile. Moreover, for any given depth of trench the cost of laying and jointing (including trenching) is practically the same for a given size pipe whether it be thick or thin, whereas the life of cast iron pipe when laid is doubled or trebled in the case of the thicker pipe. It may be accepted, therefore, that reduction of weight beyond certain limits is false economy. It is also evident that in a thick pipe, as compared with a thin one, the endurance is greater from the smaller proportionate loss due to rust, while it has less to fear from damage by heavy traffic or steam rollers, and has greater power to resist the internal shocks produced by pumping, or the too hasty closing of valves. The author described what he called a typical example of the best British practice.

The paper summarizing what has been published concerning American practice is synopsized in the reported proceedings of the meeting as follows:

In America the manufacture of cast iron pipes has now attained considerable dimensions. The principal concern is a combine of about a dozen works, with an output of over 3,000 tons per day, while the independent firms, numbering about ten, have an aggregate capacity of 1,450 tons daily. It is noteworthy that all pipes are made in 12-ft. lengths, the practice when foreign buyers specify 9-ft. lengths being to cast 12-ft. lengths and cut off the ends, the spigot-bead being formed by a wrought-iron ring shrunk on to a groove cut in the pipe for the purpose.

Various kinds of pig iron are used in combination to effect any desired quality of mixture. At one of the largest plants, when the iron is delivered at the works, six pigs are selected at random from each 30-ton car-load, and a drilling is taken from each end of each of these sample pigs. These drillings are then thoroughly mixed, and two analyses are made, the average of which is taken to represent the grade of pig in the entire lot, which is then stacked and marked. In pig having a high percentage of both sulphur and manganese, the latter will burn or drive off some of the former, so that high-sulphur pig is not necessarily objectionable. To make a suitable mixture for a certain size of pipe, four grades of pig are usually taken, being selected according to their analyses, so as to obtain the desired chemical contents when melted in combination. The following are examples of the irons for different sizes of pipe:—

	4-in. to 6-in. Pipe.	12-in. to 16-in. Pipe.	48-in. Pipe.
	Per cent.	Per cent.	Per cent.
Silicon	2.25	1.75	1.50
Sulphur	0.06	0.07	0.08
Phosphorus	1.25	1.00	0.80
Manganese	0.40	0.40	0.40
Combined carbon	0.40	0.40	0.40
Graphitic carbon	3.00 to 3.20	3.00 to 3.20	3.00 to 3.20

The pipes are cast vertically, and generally with the bell downward, but small pipe up to 8 or 10 inches diameter is frequently cast with the bell up. In general the mold is made with dry sand, the core also being of dry sand or baked "mud." Various attempts have been made to obtain an efficient substitute for hay rope in core-bar construction, the use of hay being the most expensive item of the core, costing about 2½d. for each 6-inch core. The only practical substitute appears to be a paste composed of sawdust, ground straw, or other comminuted combustible material mixed to a paste with a 3 per cent solution of hydrated starch and 10 per cent of loam. The almost universal practice, however, is still to use the hay-rope method.

Pipes are usually coated with a preservative compound, tar being the most common ingredient. This is applied hot in somewhat the same manner as is adopted in the Angus-Smith process. In some work, however, creosote oil or dead oil of coal-tar is sometimes added, in the proportion of one barrel of creosote to seven of tar. This serves to thin the bath and to increase the percentage of heavy oils in it. Asphalt compositions have been used to a limited extent on cast-iron pipe. A wide range of variation exists between the weights of pipes of the same diameter specified by different engineers, and attempts have been made to adopt a standard, but so far without much practical result.

The standard thickness of pipes of different diameters and under different pressures of water as adopted for the waterworks system of Boston is shown in the following table:—

Class of pipe	A	B	C	D	E
Head of water, ft	115	150	200	250	300
Pressure, lbs	50	65	87	109	130
	Thickness.				
Diameter Inches	Inches	Inches	Inches	Inches	Inches
4	...	...	...	0.40	0.45
6	...	...	...	0.46	0.50
8	...	...	...	0.52	0.55
10	...	...	...	0.60	0.63
12	...	0.57	0.61	0.65	0.69
14	...	0.61	0.65	0.70	0.75
16	...	0.65	0.70	0.75	0.81
20	...	0.73	0.79	0.85	0.92
24	...	0.80	0.87	0.95	1.03
30	...	0.92	1.00	1.10	1.20
36	0.93	1.03	1.13	1.25	1.36
42	1.01	1.14	1.27	1.40	...
48	1.15	1.25	1.40	1.55	...
54	1.23	1.35	1.53	...	...
60	1.35	1.50	1.70	..	..

For 36-inch pipes to be laid in Boston Harbor, the engineer adopted a thickness of 1.65 inch in order to allow for deterioration under the action of the salt water. These pipes weighed 677 lbs. per foot, or 8,500 lbs. per 12-foot length, including the socket.

Discussion.

Mr. Hill said with reference to the remark in Mr. Cloake's paper that pipes in France were usually cast vertically, he thought the French practice was to be commended. It was a good plan to cast even small-diameter pipes in this way. The manufacture of pipes 13 feet long was another excellent feature, and might be followed in this country with advantage. The only difficulty was to secure or enforce uniformity. In a country like the United States it was comparatively easy to get out of the conventional rut and cast pipes to any length which might seem desirable. Regarding the capacity of pipes to resist sudden shocks, the speaker had known several 20-inch pipes to burst. The founders now put a bolt through the pipes and wrought-iron bands round the spigot ends. The question of putting ribs in special pipes was worth considering. It occurred to him that the system of winding wire round special pipes as described by Mr. Cloake was a good plan if it did not seriously increase the cost. But that was a point not cleared up in the paper. Turning to Mr. Terry's contribution, Mr. Hill thought that it was false economy to reduce the weight of pipes for the sake of saving in the cost.

Mr. Jones said that the test of a good pipe for water-purposes was strength for normal usage and capacity to resist shock whether *in situ* or *in transitu*. The tendency nowadays was to make pipes too light. Pipes should also be capable of withstanding the operation of being drilled. It was a weakness of some engineers to specify pipes of too thin

a wall. A little extra weight uniformly placed would ensure long life. There was not sufficient margin allowed for shock and emergencies. The extra weight also gave security against corrosion. Vertical casting of water pipes was not peculiar to France, for from his experience that practice was almost universal in this country. As to casting socket downwards, it was not, in his opinion, necessary to do this in order to get the necessary thickness at the socket. In laying pipes across bridges, the speaker used flat pipes with ribs, and these had stood excellently for twenty years or more. The use of steel wire wound round cast iron pipe he considered superfluous. As to casting irregulars they could not, of course, cast all vertically. In such cases the use of wound wire might prove an advantage. Great damage was being done by the introduction of powerful electric currents, and the attention of the Legislature would have to be called to the matter in the near future.

Mr. Sainty emphasized the necessity of standards being set up for all pipe founders to work to. At present one firm used 1¼-inch, another ¾-inch, joints. The use of steel coils on pipe he thought to be quite unnecessary.

Mr. Mathews, referring to the statement that Postoffice standards were adopted abroad, said that these pipes were not used for water, but as conduits for wires, etc. He agreed with the previous speaker as to the necessity of uniform standards being adopted. That, he thought, was a work which the Association (now numbering 300 members) might take in hand. It seemed to him a serious mistake unduly to "cry up" British manufacturers as British manufacturers. If they took anything the British chose to give them simply because it was British they would be in danger of not getting the best. If foreign makers could supply something better, they as engineers were entitled to get it from abroad if firms in this country would not, or could not, supply equal quality or bring themselves into line with their competitors. The question of winding pipe with wire was discussed many years ago in connection with the construction of ordnance. Mr. Longridge was the champion of the system. He was pooh-poohed at the time, especially by the War Office, but time had proved him to be right, and he (the speaker) thought possibly Mr. Cloake might be able to show that the process adopted in France was really an economical one by permitting lighter pipe to be cast for a given specified test.

Mr. Lees disagreed with the remarks of Mr. Jones as to casting pipes downwards. Unless there was sufficient solidity at the socket they ran the risk of breaking it when caulking. Downward-socket casting gave more satisfactory results. There were no advantages in American pipes except the longer lengths now supplied. The foreign pipes did not stand any higher stresses than British-make pipes. Moreover, the Americans only quoted low prices for large lots, and in many cases, therefore, it was more convenient to buy from home makers who could supply everything that was wanted and in the quantities wanted.

Mr. Ingham, referring to the question of coating pipes, said that this was a point which required attention, especially when dealing with soft water. It was sometimes found useful to dip pipes twice for service in districts where the water was very soft. As to the paper on American practice, he might mention that 5 per cent was allowed for deviations in such castings, while in this country only 3 per cent was permitted. The French method of cementing the joints of the longer pipes from the inside seemed an objectionable practice owing to the liability of the cement falling out eventually and so helping to choke the pipe. In conclusion, Mr. Ingham emphasized the necessity for standardization, and hoped the Association would take the matter up.

Mr. Lloyd thought that riveted or welded pipes would stand where cast pipes would fall, as they could be produced to resist almost any desired pressure. As to the French method of manufacture, he did not think it needful to secure strength to resort to wire-winding, that being a system which appealed rather to artillerists than water-engineers.

Mr. Palmer gave some interesting experiences with American-made water pipes. He had ordered some five or six miles of mains from the States, but no less than 30 per cent of the whole split at the spigot. On examination the metal seemed quite good, but still the cracks were there, although, curiously enough, they were so small that when the pressure was removed they could not be seen. It cost the ratepayers about 2,000*l.* to put those pipes right. Another disadvantage was that American founders wanted buyers to take delivery of the whole order at one time. His order came in two lots, but even this was productive of great inconvenience. By buying from British firms they could get deliveries as and when they required them. The American firm to whom he referred were one of the best-known concerns in the States. They admitted that in bidding they had purposely cut the price in order to get under British makers.

The President agreed that it was desirable to establish a standard to which makers should work. If their association could come to a general understanding and adopt a standard for gauges and sockets, it would be highly beneficial alike to water-engineers and pipe-founders.

Mr. Terry, in reply, said that he did not think British makers were afraid of foreign competition, if conducted fairly. But some engineers were prone to issue a special specification, and then, when British firms could not work to it in the time allowed, the engineers in a huff went to America or Germany, and calmly accepted whatever patterns the manufacturers in those countries happened to have in stock. Electrolysis was a matter for electricians as well as gas and water engineers. If proper return-conductors were provided all mischief could be avoided; but these were expensive, and the electricians much preferred to use the earth as a return, especially where water and gas pipes existed. The government should deal with the question, but not from the electrician's point of view only. The water and gas engineer ought to be consulted also, and before more serious injury ensued.

Pittsburg Foundrymen's Association.

The regular monthly meeting of the Pittsburg Foundrymen's Association was held Monday night, Jan. 6, at the association's hall on Sixth Ave. Secretary Zimmers read an announcement of a forthcoming meeting of the New England Foundrymen's Association at Boston, Mass., in which it was stated that the executive committee of that organization was already making preparations to entertain the members of the American Foundrymen's Association in Boston in the month of June. The date for the annual convention has not yet been fixed.

S. H. Stupakoff read the second chapter of a serial paper on "The Molding Machine." The paper will be reproduced in these columns later. A paper by John G. Sadlier, of Springfield, O., on "Combustion" was also read and discussed to some extent. The amount of pressure required to melt different grades of iron was considered at length and some of the foundrymen present stated that they have melted all grades of iron with a pressure of five ounces. Others were of the opinion that a higher pressure, ranging from 10 to 14 ounces would be required to melt certain irons, but it was stated that if a blower of proper capacity were secured no such a high pressure would be required.

F. S. Witherbee, of New York, receiver of the Troy Steel Co., announces the sale at auction at the city hall of Albany, N. Y., of the plant of the Troy Steel Co. at Troy, N. Y. There are three blast furnaces 80x18 feet, built in 1887, with 12 Whitwell hot blast stoves, seven 42x84x60-inch blowing engines, and a 5,000,000-gallon pumping plant. The steel plant, built in 1896, and operated less than a year, consists of three 15-ton converters for basic or acid process, three-high 21-inch billet mill with soaking pits, gas producers, hydraulic shears, etc.; a pair of automatic compound Bessemer blowing engines, 20x50x60 triple expansion pumping plant of 12,000,000-gallons capacity; 35-inch reversing blooming mill with 42x60-inch engines; electric light plant, etc. There are two merchant iron mills with three 18-inch trains, one 14-inch train, one 9-inch train, one 7-inch train, and a sheet mill. These mills have Corliss or Porter-Allen condensing engines.

According to the *Railroad Gazette*, recent orders received by the American Car & Foundry Co. aggregate 12,010 cars.

AMERICAN COAL IN GERMANY.

Consul General Frank H. Mason, writing from Berlin under date of Dec. 3, gives further information concerning the market in Germany for coal from the United States:

Toward the end of September last, three prominent coal merchants, one from Hamburg and two from Berlin, went to the United States to examine systematically the conditions of coal supply and transportation, and, if practicable, to make contracts for a supply of certain qualities for the German market. Of the two Berliners, one is still in America, seeking to organize an international company for the export of both anthracite and bituminous coals to various European ports, especially to those in the Mediterranean, where it is believed that American soft coals for steaming and manufacturing purposes have a secure and promising future.

The other merchant from Berlin, who is well known here as the principal local importer of anthracite coals, has returned and given for publication a highly interesting statement of his experiences in the United States and his estimate of the general situation, as it relates to the importation of American coals into Germany. Under present conditions of marine freight and local demand and supply, he sees no immediate probability of any large import of American bituminous coal into this country. The only qualities which can now be obtained at the American seaboard in large quantities and at prices sufficiently low to justify their export are, says Mr. Schulze, so soft and friable that they crumble and crush in transit to such an extent that they are, when landed, inferior in grade and caloric value to Westphalian coals of a corresponding cost. American cannel and Western Pennsylvania block coals are, in his opinion, of high quality and admirably adapted to the German market, but they are so scarce and expensive at home that he saw no opportunity to do business with them. At the present low rates of freight, some cheap and inferior grades of American soft coal have been experimentally imported to Hamburg for as low a figure as 15½s. ($3.77) per ton, at which price, says Mr. Schulze, Westphalian coals of a better grade are able to compete, and he thereupon hastens to reassure the German coal-producing syndicates that their fears of a deluge of steam and factory coals from the United States are for the present groundless.

Totally different, in his opinion, is the situation with regard to anthracite, the imported supply of which for Germany has hitherto been derived wholly from Great Britain. But the continued strikes and numerous miners' holidays in the Welsh coal districts, the present export duty, and frequent interruptions and delays in delivery have made German importers ready and eager to obtain a new source of supply. Mr. Schulze reports that he visited the anthracite mines of Pennsylvania, and was amazed at the thickness of the veins, the ease and cheapness with which it is mined, the unlimited supply and the effectiveness of the machinery and methods employed for breaking, screening, washing, and grading hard coal for various uses. As a proof of his confidence in the future of this trade, he has purchased 10,000 tons of American anthracite for immediate importation into Berlin, 30,000 tons for delivery in March and April, and expects to import on his own account not less than 100,000 tons during the course of next year. Norway and Sweden, Denmark, Holland, and even London will, in the opinion of this expert, gradually turn more and more to the United States as the source of their main supplies of anthracite. The future dimensions of the trade will depend wholly upon the disposition of American hard-coal operators to foster and develop it.

Here, as in the United States, anthracite coal for domestic consumption is a luxury, the use of which is confined mainly to the well-to-do classes. The grates and stoves in which it is burned differ materially from those most used in our country, so that it will probably be found advantageous to export hard coal in lumps as it comes from the mine, to be broken, screened, and graded on this side into the sizes required by European markets. It is also stated that anthracite coal intended for household consumption in Germany should not be washed.

Whether or not the views of this merchant concerning the availability of American soft coal for German consumption are well founded and conclusive, opinions here differ. The paramount fact in the public mind is that notwithstanding the continued protests and present distress of many German industries, their narrowing output and enforced discharge of workmen, the German coal syndicates have persisted in maintaining practically the same prices which they received for coal during the flush activity of 1899 and 1900. One can hardly take up a Berlin newspaper without finding a report of some meeting of manufacturers or other class of fuel consumers to protest against the artificially maintained prices of coal and coke. Silesian coal of ordinary quality now retails at Berlin coal yards for 1.60 marks per centner delivered, which is equal to $7.61 per metric ton of 2,204 pounds. Ordinary Silesian steam coal costs in carload lots 24.40 marks ($5.80) per ton, delivered in this city. As the river freight on coal from Hamburg to Berlin is about 3 marks (72 cents) per ton, it would seem that if American or other foreign soft coal can be landed at Hamburg for any price approaching 16 marks ($3.80) per ton, there ought to be a chance for it in the retail market of the German capital.

A New Record in Connellsville Coke.

While definite figures are not yet available showing the production of coke in the Connellsville region of Pennsylvania in 1901, it is estimated, from data already in hand, that the output for the year will reach about 11,750,000 tons, which breaks the highest record by more than 1,500,000 tons. The production in 1900 was 10,166,234 tons, which was the best record up to that time by 40,000 tons. But for the hot weather last summer, scarcity of water during the fall, the steel strike and the railroad congestion in the coke regions it is estimated that last year's production would have been fully 2,000,000 tons greater than that of the previous year. The best week's production of the region in 1901 amounted to nearly 239,000 tons, and it is believed that before many months elapse in this year the weekly output of the region will amount to 250,000 tons. The past year has also been a profitable one for the coke producers, as the average price of furnace coke was from $1.75 to $2 per ton, while foundry coke ranged from $2.25 to $2.50 per ton.

The growth of this region has been marvelous in the past 21 years. In 1880 there were 7,211 ovens, as compared with 21,833 in 1901. The production in that year was only 2,205,946 tons, and the increase has been more than 9,000,000 tons in 21 years. The total output of the region, together with the number of ovens operated since 1880, is given below:

Year.	Total. Ovens.	Tons Shipped.
1880	7,211	2,205,946
1881	8,208	2,639,002
1882	9,283	3,043,394
1883	10,176	3,552,402
1884	10,543	3,192,105
1885	10,471	3,006,012
1886	10,952	4,180,521
1887	11,923	4,146,989
1888	13,975	4,955,553
1889	14,458	5,030,428
1890	16,020	6,464,156
1891	17,204	4,760,665
1892	17,256	6,329,452
1893	17,513	4,805,623
1894	17,834	5,454,451
1895	17,947	8,244,438
1896	18,351	5,411,602
1897	18,628	6,915,052
1898	18,643	8,460,112
1899	19,689	10,129,764
1900	20,954	10,166,234
1901*	21,833	11,750,000

*Estimated.

In addition to calendars for 1902 already acknowledged, all of them effective artistically, we have received those of the following: J. F. Corlett, dealer in iron and steel, Perry-Payne Bldg., Cleveland; Wm. H. Wood, engineer, Media, Pa.; Matthew Addy & Co., pig iron, Cincinnati; the Audit Co. of New York; the Acme Foundry Co., Cleveland, O.; Geo. B. Sennett Co., Youngstown, O.; Clinton Iron & Steel Co., Pittsburg. Leather bound daily reminders for 1902 come from the Vulcan Iron Works Co., Toledo, O., and the Trenton Iron Co., Trenton, N. J. Henderson & Trago, of Cleveland, dealers in pig iron and coke, have sent out a leather-framed desk calendar with monthly cards.

A NOTEWORTHY MACHINE MOLDING PLANT.

Within a year at the Schenectady shops of the General Electric Co. 65 power ramming vibrator molding machines have been installed. Owing partly to the design of the machines, partly to the intelligence and progressiveness of the management, the installation is so revolutionary in its results and new methods as to deserve more than passing comment. Foundry economics have in only comparatively recent times attracted the attention they deserve, and in this particular shop the liberality of the policy of the company has kept the foundries fairly in the van of foundry progress. So typical of modern foundry practice have the General Electric Co. foundries always been considered, that the main shop, its ways and its byways, have been much explored and illustrated in the technical and trade press.

There is nothing startlingly new about a molding machine. The time honored stripping plate machines are older than almost any foundry in this country. Nearly all the changes have been made on different methods of ramming the sand and guiding the pattern out of it with "a clean lift" and the demand for cheaper costs has brought out a great array of machines. From this large field the management at Schenectady set out to make selections. At one time they had a museum-like collection, some of the machines in which are destined to become very rare in time. As a result of this process of natural selection, it is doubtful if anywhere so large a variety of work is produced in castings by unskilled labor at so small a cost both for molding and for patterns.

Wooden patterns are fastened to wooden plates to make as few as ten molds. Gated patterns are attached to vibrator frames and used without change—a laborer turning out 200 10x18-inch snap flasks with a machine, the saving on which, using the same patterns formerly used by hand, pays for itself in 15 to 20 working days. Over 2,000 sets of patterns are now fitted to vibrator machines in this way,

FIG. 1.—30 X 48 IN. SPLIT PATTERN POWER RAMMING MACHINE FITTED WITH A WOODEN PATTERN FOR AN OIL BOX CAP, WEIGHING 1,000 LBS.

and a visit to the pattern loft in the foundry where patterns on orders were seen, showed plated patterns for machines to be sent to the foundry to make only one flask on a job.

A man to whom the foreman talked in sign language was seen with a large floor up, molded from 11 different patterns during the day.

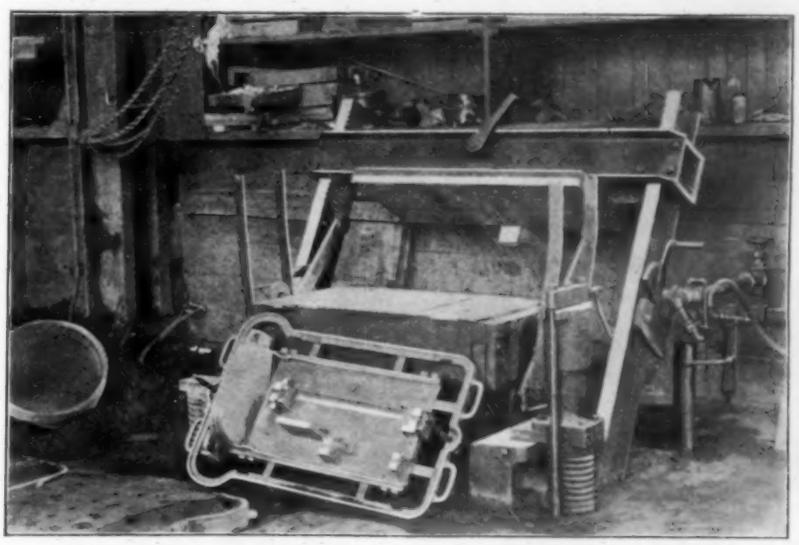


FIG. 2.—60-IN. TABOR RAMMING MACHINE SPECIALLY FITTED WITH VIBRATOR FRAME AND ATTACHMENT FOR DRAWING PATTERN BY POWER.

In machines of a size molding flasks 24 inches square and larger, the General Electric Co. works a molder on each machine. Large molds with intricate and expensive cores, where skill counts not only in ramming the sand and drawing the patterns, but in the setting and venting of the cores and pouring the mold, represent when finished a considerable investment, and if the molder's trade and skill counts any-

where it counts on such work. The loss of a single mold in a day might sacrifice all the saving from dispensing with the molder.

There are in the Schenectady foundry power ramming molding machines using wooden patterns on wooden plates in flasks 30x48 inches. Such a machine and such work merit the attention of a trained mechanic and the management shows its appreciation of the man and the machine in this administration of a labor problem. It is very evident that the molder has not yet become inured to the sight of the appalling number that registers his progress and that of the machine. Like many another vicarious creator, at the sight of another mold on his floor he sees the future look but dark.

Fig. 1 shows this large machine (30x48-inch flask) ready for the next half mold. Twelve molds, pouring 1,000 pounds each, were the work of two men and the machine a few weeks after it started. Figs. 2, 3 and 4 show an application of the vibrator frame to large solid flasks for molding the iron backs or frames for the well known trolley-car controllers. Mr. Clark of the General Electric Co. originated a very ingenious method of doing this, including an arrangement for rolling the drag flask over in the machine. As in all uses of the open vibrator frame, the original brass pattern in one piece as formerly molded by hand was made available. Fig. 4 shows some of the vibrator frame machines in the brass foundry, fitted with gated patterns. Extra vibrator frames are hanging on the wall.

Ingenious arrangements of flasks, pins, etc., found in this foundry are the result of Mr. Clark's study of the uses of molding machines. A noteworthy example of this is a rig for three part work in solid flasks, where some of the "cheeks" are almost inconceivably delicate. The workings of this plant indicate that the management has adopted some such platform as this. First. It pays to ram molds by power, even when some hand tucking is necessary. Second. Single detached efficient machines, units by which no man or machine is so dependent on some other man or machine, or part of a machine that, to avoid continual delays, it is necessary for all failures of men or machines to happen simultaneously.

There are some foundries today built so much on the principle of a chain, that it appears to be an unwritten law in each that all the links should break at the same time and the slowest man set the pace.

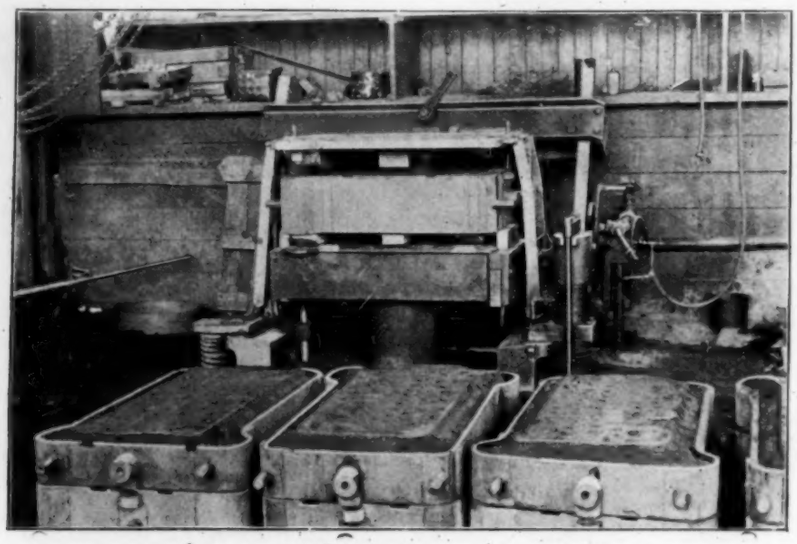


FIG. 3.—60-IN. TABOR MACHINE DRAWING PATTERN.

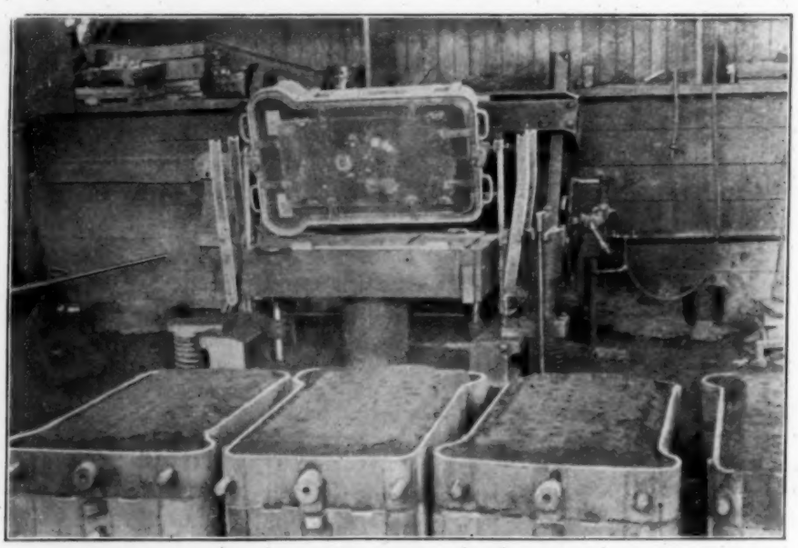


FIG. 4.—60-IN. MACHINE WITH ROLL-OVER ATTACHMENT IN OPERATION.

The molders employed in the foundries of Youngstown, O., are now securing a minimum of $2.75 per day of 9 hours. Last summer the molders asked for a nine-hour day with the same scale of wages as for the 10-hour day, but the foundrymen only conceded a half hour per day on July 1 and the other half hour was granted the molders on Jan. 1.

THE VALUE OF SHOT IRON.

The question whether shot iron is worth saving or not is one that, it seems to me, should be very easily answered. For instance, how would this do for an answer: The market price of shot iron is now higher than that paid for pig iron at the Birmingham furnaces four years ago. In fact, it is enough higher to enable you to pay the expense of extracting the shot from the dirt with the difference—or very nearly so. Evidently it is well worth saving. It is my opinion that within a few years, when the practice of saving the shot iron from the cupola dump becomes general, there will be found economical uses for this class of cast iron that will cause its market value to advance very considerably beyond what it is today. It is quite probable that the majority of foundrymen are not aware of the fact that there is a market for this product. But there is.

It is generally necessary to create a market for new products, no matter how valuable they may be. In fact, it is often the case that greater difficulty is found in creating a market for things of exceptional value, than for cheaper commodities. Manufacturers of malleable castings used to bury their annealed scrap—there was no market for it. Today it has a high value. In former times, before the malleable castings industry had attained to any considerable proportions, there was but comparatively little annealed scrap to dispose of and therefore, nobody cared to experiment with it. But, in the course of time, the aggregate product of the country became enormous, and so it became worth while to make a very determined effort to find out some means of employing it; with the result that any quantity can now be readily disposed of.

It will be just the same with regard to cast shot iron. So soon as the foundrymen of the whole country get to saving the hundreds of tons of iron that are now thrown out in the cupola dump, the price of shot iron will be quoted in the markets as regularly as that of any kind of scrap iron. Some foundries can use all their product of shot iron in their cupola mixtures, while others cannot. Shot iron does not act alike in all foundries, even though the proportions of the mix be the same; and that for the reason that the qualities of the pig iron vary. Shot iron will mix with a non-chilling charcoal pig iron without giving any injurious sign of its presence in the casting product. The same is true of some coke irons—but not of all coke irons. Why this is true is a question that I gladly leave to chemists. Of course, I have my opinion—but I'd rather witness a fight than to participate in one; so, therefore, I refer the question to the chemists.

And I wish to state also that I appreciate fully the value of the chemist's services in a question of this character. While it is true that chemists have sometimes differed greatly in opinion as to the physical effects produced by certain mixture, still, that is no worse than happens in any line of research. The friction of conflicting opinion brings out the luster of truth in the end. Finally, whether you be able to use the shot iron product of your own shop or not, you can sell it at a price that will afford you a good round profit in the work of saving it.—[E. H. Putnam in the Tradesman.

George H. Tatnall, of Pittsburg, has resigned as general manager of the Schonthal Iron & Steel Co. at Cumberland, Md. He has been succeeded by B. Schonthal of Columbus, O. This plant was formerly operated by the Potomac Steel Co.

N. & G. Taylor Co. of Philadelphia announces that in addition to the manufacture of tin plate, in which it has been engaged for years, it is now in position to supply from its mills open-hearth, soft steel sheets for stamping purposes. The company also manufactures plate iron and steel. From its sheet mills the company is now prepared to ship heavy sheets, in the gauges included between Nos. 8 and 18, in widths up to 48 inches and in length up to 144 inches.

Announcement is made that on and after Jan. 15, 1902, the general sales offices of the Pennsylvania Steel Co., and the Maryland Steel Co. will be located in Philadelphia, and all communications regarding sales, shipments, etc., should be addressed to H. F. Martin, general manager of sales, The Pennsylvania Steel Co., Girard building, Philadelphia. A local sales office will be retained at the plant of the Pennsylvania Steel Co., at Steelton, Pa., and all business originating in the adjacent territory will be handled by Chas. W. Reinoehl, sales agent.

FIG. 5.—TABOR POWER RAMMING VIBRATOR FRAME MACHINES IN BRASS FOUNDRY.

For the calendar year 1901 the American Car & Foundry Co. built in its various departments approximately 65,000 cars, of which about 500 were passenger cars. It is officially stated that orders placed for cars by the railroads in the last quarter of 1901 were fully 50 per cent larger than for any preceding similar quarter.

The Lackawanna Iron & Steel Co. has purchased the Sherman interest in the mines, railroad property and furnace of Witherbee, Sherman & Co., at Port Henry, N. Y. This company owns extensive ore property on Lake Champlain. Of late shipments have been made from the company's mines, not only to furnaces along the Hudson river and in the Lehigh and Schuylkill Valleys, but also to the furnaces of the Dominion Iron and Steel Co., Sydney, Cape Breton.

The Bradford Belting Co. reports through President C. Gordon Neff that the year just closed was the largest and most profitable in the company's history.

PERSONAL.

C. L. Grimes, who resigned recently as superintendent of Williams, White & Co., Moline, Ill., to go into business for himself at Wichita, Kas., was presented with a gold watch by the Williams, White & Co. employes.

F. L. Grammer has resigned as superintendent of the blast furnaces of the Colorado Fuel & Iron Co., Pueblo, Col.

President J. A. Kebler, of the Colorado Fuel & Iron Co., has gone to Egypt on a trip of recreation. He will be absent several months.

Joseph Riddell, who has been manager, secretary and treasurer of the Shenango Machine Co., of Sharon, Pa., in a connection of 20 years with the company, has retired on account of ill health.

Harry W. Armstrong, who for 20 years has been superintendent of the plant of the Verona Tool Works, Verona, Pa., was elected president of the James H. Baker Mfg. Co., last week, with offices in the Park building, Pittsburg. The plant of the Baker Mfg. Co. is located at Tarentum, Pa., and is being largely extended at the present time.

George A. Chalfant has retired from the firm of Spang, Chalfant & Co., Pittsburg, Pa. The interest of the retiring member goes to Henry Chalfant, a son of the late John W. Chalfant. The company is one of the pioneer merchant pipe and tube manufacturing concerns of the country.

Samuel McDonald, superintendent of the Bessemer plant of the Republic Iron & Steel Co., Youngstown, O., has resigned. He will be succeeded by Charles Hart, blast furnace superintendent of the company. In the future Mr. Hart will have charge of both the blast furnaces and steel plant. It is reported that Mr. McDonald will be placed in charge of the steel department of the Youngstown Iron Sheet & Tube Co., Youngstown, O.

O. H. Smith, formerly connected with the Inland Steel Co., Chicago, has been appointed superintendent of the plant of the Cambridge Rolling Mill Co., Cambridge, O.

Superintendent W. L. Taylor, of the Dennison, O., plant of the American Sheet Steel Co. has resigned and will be succeeded by Mark McDonald, of Carnegie, Pa.

Hon. John F. Budke has resigned his position as superintendent of the Canonsburg, Pa., plant of the American Tin Plate Co. He will probably become superintendent of the new plant of the Parkersburg Iron & Steel Co., Parkersburg, W. Va. Mr. Budke will be succeeded by Joseph Phillips, of Washington, Pa.

Arthur F. Luke, who resigned as treasurer of the United States Steel Corporation, has become a member of the banking and brokerage firm of Darr, Luke & Moore, of New York and Pittsburg. Mr. Luke has been succeeded by Mr. Trimble as treasurer.

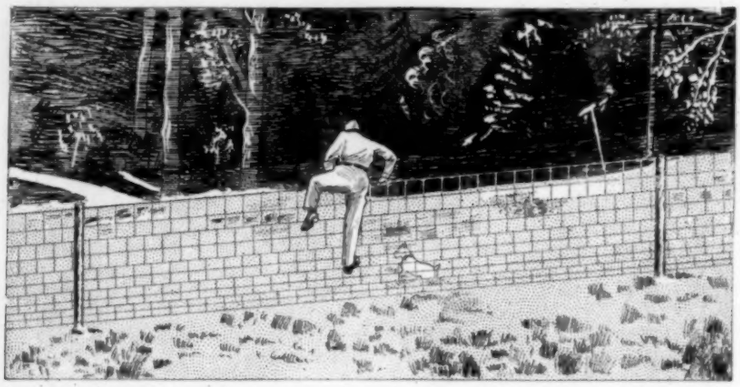
J. M. Hansen, who recently retired as chief engineer of the Pressed Steel Car Co., of Pittsburg, was presented with a set of silver by the engineering force of the company. He will be succeeded by G. H. Goodell, who has been assistant chief engineer.

John Spearman, president of the Spearman Iron Co., whose furnace at Sharpsville, Pa., was sold to the Shenango Furnace Co., was presented with a gold-headed cane by the furnace employes upon his retirement. Mr. Spearman is one of the oldest iron manufacturers in the country, having become connected with blast furnace management in 1847, when he operated the Sharon furnace for Shoenberger, Agnew & Co. In 1853 he purchased the Mazeppa furnace near Mercer, Pa., which he operated until 1859. He then became manager of the historic Sharpsville furnace until 1862. In 1872 he organized the Spearman Iron Co. and has ever since been the manager of that company.

The resignation of W. H. Purcell, superintendent of the Morgan Engineering Co., of Alliance, O., became effective on Jan. 1. J. L. Lloyd has been appointed his successor. C. L. Taylor has been made chief engineer, T. D. Russell, assistant treasurer, and A. F. Morris, manager of the sales department. The above named have become members of the firm. Others will be taken in as soon as conditions justify. R. K. Withman has been appointed superintendent of maintenance, and F. E. Farmer, superintendent of production. Mr. Purcell becomes general manager of the Alliance Machine Co.

GRISWOLD FIELD FENCING.

The accompanying illustration shows the new type of Griswold field fencing, which is manufactured by the Dillon-Griswold Wire Co., Sterling, Ill. This fence is especially adapted for stock purposes by its peculiar construction, and the demand for it has been such that the company has been compelled to increase considerably its capacity. Besides improvements and additions in the drawing room and an increase in the baking capacity, the company has installed six



improved machines in the bale tie department, and four improved machines for the manufacture of the Griswold fencing, which will be in operation early this month. These machines are superior to the old equipment in that they will produce at one time two rolls of the low mesh fencing, 18-inch and 24-inch heights, and will largely increase the output.

The Griswold field fencing, the manufacturers claim, is scientifically correct, having been brought to its present state by constant experiments and changes. The spacing or distribution of wires is suited to the needs of the consumers. The 24-inch height is a favorite for small stock, while the 39-inch and 50-inch heights are best for general stock purposes. The close spacing of the longitudinal or cable wires at the bottom, increasing from the first three bars up to the top, makes this fencing one of the best combinations. Another feature in the construction of the 50-inch and 56-inch heights is that the top cable is a No. 7 gauge wire, the next strand No. 8, the third cable No. 9, the intermediates No. 11, while the bottom wire is No. 9. The top and bottom cables of the 18-inch, 24-inch and 33-inch fencing are No. 9 gauge wire, while in the 39-inch, 50-inch and 59-inch heights No. 7 is used, for intermediate wires No. 11, and for mesh or stay wires No. 12½. The company's catalogue and booklets illustrate the various kinds of fencing manufactured by it, and will be sent on request.

The American Bridge Co. has purchased the properties heretofore owned by the Detroit Bridge & Iron Co. of Detroit, and it will be known hereafter as the Detroit plant of the American Bridge Co. Max J. L. Towler has been appointed manager. The plant thus becomes a part of the Western division of the American Bridge Co., under the jurisdiction of August Ziesing, Western manager, in Chicago.

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New Buyers in the Market and Some of their Wants:—

The Detroit Separator Co., Detroit, has been incorporated with $18,000 capital.

The Wardner Hardware Co., of Wardner, Idaho, has been incorporated with $10,000 capital. W. E. McKinney, J. F. VanAllen, C. H. Wentz, Thomas Wright and A. Paye are the incorporators.

The National Foundry & Mfg. Co., of Terre Haute, Ind., is considering the location of a branch plant at Wichita, Kas., to manufacture farming implements. A new company is to be organized to operate this branch with a capital of $25,000.

The Reversible Disc Plow & Implement Co., of Chattanooga, Tenn., has been incorporated with $50,000 capital. O. F. Janes, M. T. Freeman, A. W. Boyd, E. Manes and W. B. Michael are the incorporators.

The Berris-Votteler Co. of Brooklyn, N. Y., has been incorporated with $5,000 capital to buy and sell scrap iron and steel, relaying rails, etc. Martin Berris, Fred Votteler and Otto A. Samuels are the incorporators.

The Sheffield Foundry Co. of Chicago has been incorporated with $12,000 capital to conduct a general foundry and machine shop. Christian Kuy, J. G. Robertson and M. McGregor are the incorporators.

The Western Brass Manufacturing Co. of Chicago, Ill., has been incorporated with $5,000 capital to manufacture brass and bronze. Joseph Hadka, Caspar Schweitzer and C. B. Pavlicek are the incorporators.

The Societe Anonyne Westinghouse has been organized in Paris, France, with a capital of 20,000,000 francs for the purpose of extending the sale of Westinghouse products in various continental European countries. The new concern acquired the business of the Societe Industrielle D'Electricite, a company of 10,000,000 francs capital which formerly controlled the patent rights for manufacturing and selling Westinghouse products in France. The DeBeers Consolidated Diamond Mines, Ltd., of Kimberley, South Africa, have just awarded contracts to American concerns for the erection and equipment of a mammoth power plant. Milliken Bros., of New York, have been awarded the contract for erecting the plant, while the Westinghouse Electric & Mfg. Co., has been awarded the contract for equipping the plant with two turbines of 1,000-kilowatt capacity each. The contract for the turbines is the first secured by the company for export purposes.

The Canton Crucible Steel Co. of Canton, O., has been incorporated with $20,000 capital under the laws of West Virginia.

The Stephens-Adamson Mfg. Co. of Aurora, Ill., has been incorporated with $35,000 capital to manufacture machinery. W. W. Stephens, F. G. Adamson and D. B. Pherson are the incorporators.

The Algoma Tube Works of Toronto, Ont., has been incorporated with an authorized capitalization of $30,000,00. Merchant pipe and casing will be manufactured by the Perrin patents. The new concern is one of the Clergue interests, and the plant will be located at Sault Ste. Marie. F. H. Clergue, E. V. Douglas, W. P. Douglas, F. S. Lewis, John S. Freeman and H. C. Hamilton are the incorporators.

The Bailey-Raymond Machine Works of Sacramento, Cal., has been incorporated with $25,000 capital. C. W. Bailey, J. P. Raymond, C. C. Raymond, R. Bailey and W. S. Rea are the incorporators.

The Hyle Brothers Steel Co. of Syracuse, N. Y., has been incorporated with a capital of $50,000 to manufacture wood and steel-working tools. A plant will be erected at Syracuse. Peter Eckel, James S. Gordon, B. E. McKevett, W. A. Hyle and C. H. Reynolds are the incorporators.

The National Nut Co. has been incorporated in New Jersey with a capital stock of $50,000. The principal office will be at Jersey City and the incorporators are Geo. D. Dutton, Frank W. Dutton and K. K. McLaren.

The equipment of the Clyde Iron Co., Duluth, Minn., is to be largely increased, mainly in the machine shop and the new chain department. The chain factory will be among the first in the extreme Northwest. Two buildings are to be erected, one 40x100 feet, three stories high, and a single story structure, 40x192 feet.

The Hildreth Motor & Pump Co., Lansing, Mich., is purchasing equipment for a new three-story building, 20x54 feet. This includes an 18-inch x 8-foot lathe, 20-inch shaper, 20-inch drill press and other modern tools and a new or second hand power elevator. The new company is a reorganization of Hildreth & Co., manufacturers of iron pumps and supplies, and the manufacture of these will be continued with the addition of a line of gas and gasoline motors from 1 to 12-h. p.

J. E. Clark, 530 West Haywood street, Asheville, N. C., wants prices on a new or second hand Corliss engine of 175 to 200 h. p. at less than 100 pounds boiler pressure.

F. P. White, Shallotte, N. C., wants a second hand 30 or 35-h. p. marine engine and boiler; also a 35 or 40-h. p. engine, gasoline, marine or stationary.

Crook, Horner & Co., Baltimore, Md., are in the market for rollers for ⅜-inch boiler sheets, punching machine and shears for ½-inch steel.

The Sheffield Foundry Co., Chicago, has taken out incorporation papers with a capital stock of $12,000. The incorporators are Christian Kuy, Major McGregor and James G. Robertson.

The Cannon Metal Wheel Co., Ltd., Pontiac, Mich., has been incorporated with a capital of $300,000, for the manufacture of metal wagon, carriage, buggy and agricultural wheels and handy wagons. A new plant will be built 80x200 feet. The following officers have been elected: Mason W. Gray, president; Frank G. Jacobs, treasurer; Thomas M. Little, secretary and general manager.

Fires and Accidents:—

The plant of the Mesker Structural Iron Works, Evansville, Ind., was recently destroyed by fire. Loss, $50,000.

The machine shop of Dunford & Alverson's dry dock, Port Huron, Mich., was destroyed by fire last week. Loss, $8,000.

The plant of the Ampere Brass Foundry Co., East Orange, N. J., was destroyed by fire last week, with a loss of $3,000.

The Puritan Bed Springs Co.'s plant at Indianapolis was damaged by fire to the amount of $3,000.

At Albany, N. Y., a fire originating in the polishing department of the foundry of Rathbone, Sard & Co. partly destroyed the four-story building of brick and wood. Loss, $20,000; covered by insurance.

New Construction:—

The steel producing capacity of the New Castle, Pa., plant of the National Steel Co., is to be considerably increased by the installation of larger converters. At present the plant contains two 6-ton vessels, but these are to be taken out to make room for larger ones. The capacity is to be increased to about 1,000 tons per day. The plant will be closed some time during the month of February to make the change.

The Moline Tool Co., Moline, Ill., will shortly move its plant into a new building and a large amount of new machinery will be installed. The output of the plant is to be practically doubled.

The Harrison Safety Boiler Works, Philadelphia, Pa., will erect a one-story machine and erecting shop adjoining its present plant, whose dimensions will be 44x82 feet.

The plant of the Abbott Electrical & Mfg. Co. has been removed from Cleveland to Warren, O. The company will manufacture novelties, together with a line of plumber's brass goods. A brass foundry 45x46 feet is now under construction, and eight large brass furnaces will be installed. This plant will be in operation early in January.

Victor Knecht, the Phœnix Iron Foundry has purchased a tract of land 300x500 feet adjoining the Fairmount plant of the Lunkenheimer Co. and the plant of the Cincinnati Screw & Tap Co. The property was purchased from the Cincinnati & Westwood railroad and it is understood that Mr. Knecht contemplates the building of a new foundry.

The Joseph Dixon Crucible Co. of Jersey City, N. J., is building extensions to its plant, covering 100x200 feet.

The Knoxville Iron Co., Knoxville, Tenn., has let the contract for the erection of the $500,000 iron works at Lons-

dale, Tenn., to the Structural Iron & Steel Co., Baltimore, Md.

H. N. Strait Mfg. Co., Kansas City, Mo., will build a foundry and machine shop.

The Gadsden Pipe Works, Gadsden, Ala., have let contracts for the erection of a building 125x200 feet, modern in its equipment, which will be used for the manufacture of pipes.

The contracts for the machine tool equipment for the shops of the Lake Shore & Michigan Southern at Collinwood, O., have been distributed among the following firms: Marshall & Huschart Machinery Co., Manning, Maxwell & Moore, Strong, Carlisle & Hammond Co. and the Niles Tool Works.

The Ellicott Machine Co., Baltimore, Md., has had plans prepared for the erection of a one-story structure, of steel frame construction, 150x200 feet, which will be used as a foundry.

The Sheffield Stove & Foundry Co., Sheffield, Ala., will enlarge its plant.

During 1901, the McCormick Harvesting Machine Co., Chicago, found it necessary to erect a number of new buildings to meet the increased requirements. Following are the dimensions of the more important additions made during the year: Tempering room, 28x30, one story; press room, 28x40, one story; oil tanks, 33x57, one story: foundry, 54x288, one story; blacksmith shop, 92x190, one story; malleable works, 200x320, two stories; paint and packing room, 83x60, five stories; paint mill, 60x120, five stories; warehouse, 84x160, five stories; twine mill addition, 150x200, six stories. These buildings furnish upwards of 12 acres of additional floor space, and 48 acres of ground have been recently purchased for the purpose of further expanding the plant. During 1901, more than 360,000 McCormick machines were made and sold, and with the additions enumerated above, the capacity of the works is one complete machine every 20 seconds.

Work has been commenced on the new foundry of the Novelty Stove & Mfg. Co., Savannah, Mo., which is to cost $10,000.

The Moore Bros. Foundry & Stove Works, Wichita, Kan., will build an addition to the foundry and warehouse that will fully double the capacity.

The Ludlow-Saylor Wire Co., St. Louis, Mo., has practically completed the removal of all manufacturing departments to the big and recently enlarged plant on Newstead avenue and the Wabash Railroad tracks. The store, offices and salesrooms, however, remain at Fourth and Elm streets.

Contracts will shortly be let for the construction of the plant for the Canton Structural Steel Car Co., Canton, O. The main building will be 78x504 feet, and engine and boiler house and blacksmith shop, 50x175. The entire plant will be operated by electricity. Two 250-h. p. boilers will be installed.

The Magnetite Foundry Co., St. Louis, Mo., has recently taken on some large contracts which, superimposed on previously secured orders for castings for forward delivery, practically take up the capacity to April 1. The company is, however, contemplating further additions to plant.

Reports state that the Dillon Machine Co., Dallas, Tex., will enlarge its plant. Three acres of ground are to be purchased, and large foundry and machine shops erected to give employment to 150 men.

It is said that the Sheffield Stove & Foundry Co. of Sheffield, Ala., will enlarge its plant.

It is reported that the Baltimore & Ohio Railroad Co. (principal office, Baltimore, Md.) will establish large shops at New Martinsville, W. Va.

The Canton Roll & Machine Co., Canton, O., will build an addition to its foundry.

The Marine Boiler Works, recently incorporaated at Toledo, O., with a capital of $100,000, will erect a new boiler shop 235x100 feet. The new company absorbs the Reeves Boiler Works.

The Rochester & Pittsburg Coal & Iron Co., of DuBois, Pa., has decided to erect a blast furnace at DuBois, Pa. The stack will be 80 feet high and will have a 19-foot bosh. There will be four stoves in connection with the stack. It is altogether probable that a large foundry and rail rerolling plant will also be erected in connection with the furnace.

The Ellicott Machine Co., Baltimore, Md., will erect a new foundry 150x200 feet. The company is in the market for electric cranes, foundry equipment and heating and ventilating machinery for the foundry.

The American Tin Plate Co. will erect a corrugating plant in connection with its Chester, W. Va., tin plate plant.

The Pittsburg District:—

The American Bridge Co. has decided upon the erection of an eye-bar plant in the Pittsburg district. Recent contracts closed by the company for the erection of bridges over the Ohio and Monongahela rivers call for the manufacture of very large eye-bars and as about 1,800 tons will be required it has been decided to erect a plant for their manufacture. The contract for the machinery to be installed in the plant has already been placed with the Bethlehem Steel Co. The company now has four eye-bar plants in this country.

The Parkersburg Iron & Steel Co. of Pittsburg, whose plant is located at Parkersburg, W. Va., has purchased the plant of the Budke Mfg. Co. at Canonsburg, Pa. The consideration is said to have been nearly $100,000. All the stamping machinery contained in the plant will be removed to Parkersburg, where a stamping plant will be erected adjoining the sheet mill. Almost the entire output of the sheet plant will be consumed in the stamping plant.

The Peerless Metal Mfg. Co. has removed its offices from the Bank for Savings building, to 1010 Park building.

The Anchor Engineering & Machine Co., Pittsburg, has been reorganized to engage in the manufacture of the Anchor gas engine and general rolling mill machinery. The new company is capitalized at $150,000.

The ornamental iron workers of Pittsburg have presented their wage demands to their employers for the year commencing Feb. 1, 1902. The fitters are asking for an 8-hour day with an advance in wages from 33 1-3 cents an hour to 45 cents an hour. Helpers now receiving 25 cents an hour ask for an advance to 32½ cents an hour.

The coroner's jury sitting at Pittsburg last week decided that the boiler explosion at the Black Diamond plant of the Crucible Steel Co. of America was caused by low water in the boilers.

The rod mills of the American Steel & Wire Co., Braddock, Pa., resumed operations this week after an idleness of nearly a month. Extensive repairs were made in the meantime and improvements completed that will greatly increase the output of the mills.

General Industrial Notes:—

The Kindl Car Truck Co., Old Colony Bldg., Chicago, will increase its capital stock from $150,000 to $300,000.

The Simplex Railway Appliance Co., Chicago, Ill., has increased its capital stock from $250,000 to $750,000.

The Tod-Stambaugh Co. of Cleveland, O., dealers in iron ore, was incorporated last week with a capital of $250,000. Frank Billings, R. McCurdy, John Stambaugh and C. D. Hine are the incorporators. Before the incorporation the firm was known as Tod, Stambaugh & Co.

Work on the erection of the new billet mill at the Bessemer plant of the Republic Iron & Steel Co., Youngstown, O., is progressing rapidly. In all probability the mill will be placed in operation April 1.

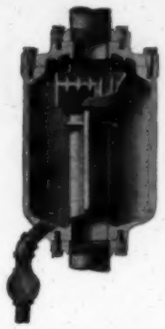
Memphis, Tenn., has been selected as one of the Southern distributing points of the American Steel & Wire Co. Wire and wire nails are shipped by barges from mills along the Monongahela and Ohio rivers. The latest consignment to these warehouses consists of 9,000 tons of finished material.

The turnbuckle plant of the Republic Iron & Steel Co., at Brazil, Ind., will be removed to Terre Haute, shortly.

The Harrisburg Foundry & Machine Co., Harrisburg, Pa., has been awarded a contract for a 650-h. p. engine to be installed at the Hotel Netherland, New York. Another order calls for a 600-h. p. engine for the H. J. Heinz Co., Pittsburg.

The Pawtucket, R. I., plant of the Nicholson File Co., will be dismantled and the machinery will be removed to the Anderson, Ind., plant of the company.

Furnace No. 2 of the Columbus Iron & Steel Co., Columbus, O., which was recently disabled by an explosion, is out for repairs. The furnace will be out of blast for fully a month.



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During the conversation he explained that he knew our **COCHRANE SEPARATORS** well and was a firm believer in them, and then he related the following very interesting account of a personal experience that explained his conviction regarding the exceedingly high efficiency of the **COCHRANE OIL SEPARATORS.**

Said he, "Quite recently I was at a large power plant in Pennsylvania while they were conducting tests on three new engines. Each of these engines was protected by a steam separator, a different make of separater being used for each. Through some mischance the lubricator connections to the main steam lines were placed above, i. e., ahead of the Separators, which necessitated the oil passing through the Separator before it could reach the engine cylinders. The test was interrupted by the discovery that one of the engines was receiving no oil whatever, though the other two engines were obtaining lubrication. On the line leading to the first engine, which was endangered by the lack of cylinder oil was a **COCHRANE SEPARATOR.**" "This to me" said the gentleman who related the incident, "As well as to all the others present, was proof conclusive that the **COCHRANE SEPARATOR** was the ideal device for removing oil from steam. Write for catalogue "11-S."

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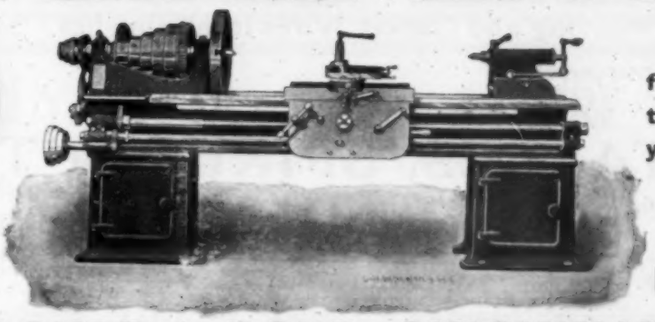

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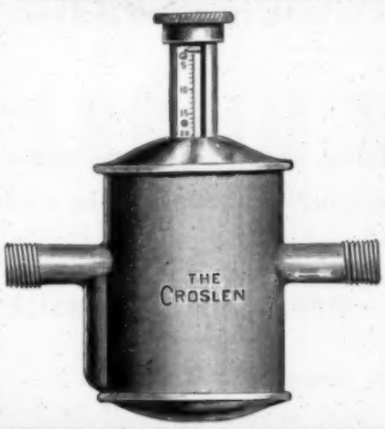

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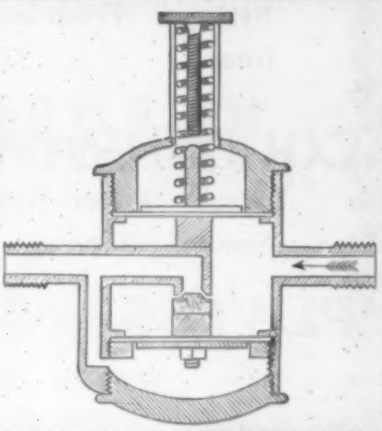

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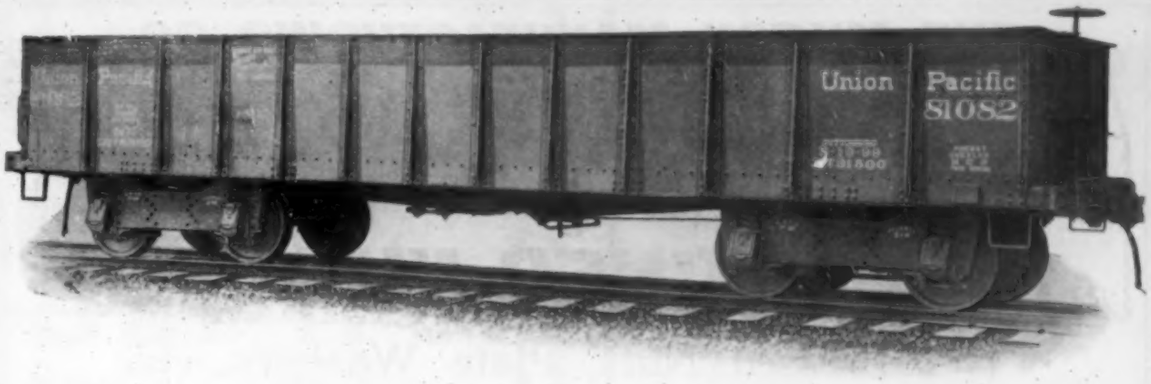

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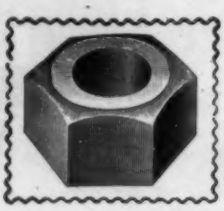

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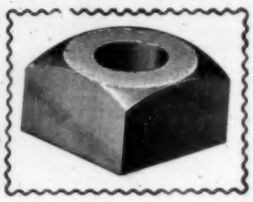

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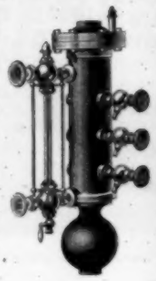

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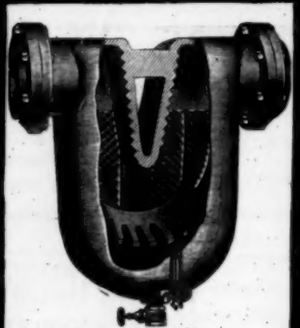

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